Measuring The Impact:
A Survey of Impact Metrics in Environmental Real Asset Investing

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ABSTRACT

Private investment in environmental real assets has increased over the past decade due to their low correlation with financial markets, inflationary hedge benefits, and connection to impact investing. As investment funds begin to manage these assets, concerns arise over environmental accounting practices. To better understand which impact metrics funds currently use and what motivates measurement, we interviewed 19 fund managers from environmental real assets funds. Results revealed that current impact metrics schemes are disparate within and between asset types. Funds are motivated to collect environmental data by internal and external drivers, including voluntary certifications, regulations, and investor requirements. If environmental accounting is to mature, fund managers, investors, wealth advisors and environmental professionals must align expectations of metrics and reporting.
EXECUTIVE SUMMARY

In the midst of global resource scarcity and environmental stress brought about through human activity, Environmental Real Asset investment is of growing interest and investment. Where Real Assets can include infrastructure, commodities such as oil, and real estate, Environmental Real Assets derive their value directly from natural processes. Investors in this space include high net worth individuals, family offices, and a range of institutional investors interested in committing capital to meet a variety of needs. As there are little public data, measuring the environmental impact of these investments is a key concern of those dedicated to environmental management.

For this research, we surveyed 19 funds that invest directly in 5 Environmental Real Assets: timber, agriculture/rangeland, water rights, wetland mitigation services, and fisheries quota shares. We asked primary research questions:

1. What environmental metrics are funds collecting?
2. What motivates funds to collect environmental data?
3. What role do investors, wealth advisors, regulators, and certifying entities play?

We found the use of disparate metrics by funds both within and across asset type. The unique characteristics of each asset, the presence of regulations/certifications, lack of environmental expertise, and varying investor requirements drove this inconsistency in metrics. Certifications and regulation provided for some standardized metrics, but were not platforms for competition.

Investors motivated the majority of environmental accounting efforts. Other motivators included correlation to financial performance, marketing and sales, the fund’s mission, regulation, consumer and supply chain demand, and due diligence processes.

Funds competed for capital based on marketing of procedures and protocols for environmental metrics, not the environmental performance of their assets. This was largely driven by Institutional Investors who require impact policies and typically do not scrutinize real impact. Whether funds identified as conventional or impact did not determine their environmental accounting efforts.

Nearly all fund managers called for a consolidation of impact metrics, with the goal of better understanding environmental impact. Wealth advisors may play a significant role in the efforts to consolidate impact metrics that funds collect into a single unified framework. Indeed, fund managers and investors are beginning to see standardized frameworks for impact metrics emerging from organizations such as the Global Impact Investing Network. It remains to be seen if these frameworks can be widely adopted.

We see the need for more environmental expertise in environmental real asset investing. Investors, fund managers, and wealth advisors are all trying to verify, interpret, and report environmental metrics, but have varying (and often little) environmental expertise. We expect stronger regulation in fisheries, water rights, and mitigation banking, and slow progression towards standardization through metrics and other efforts for timber and agriculture. Investors will slowly gain sophistication, while their disparate interests may not change.
1.0 - INTRODUCTION

Private investment funds are consistently looking to provide opportunities for competitive market returns and non-market correlated investments with varying time horizons to diverse sets of institutional and individual investors. As widespread concern over climate change and natural resource depletion grows, investors are also increasingly including mission driven goals as explicit investment objectives. Fund managers and investors have been turning to environmental real assets (a suite of real assets that rely on ecological systems to generate cash flows such as timber, agriculture, wetlands mitigation, and others) to achieve a combination of investment objectives, as each asset provides a different mix of risk, portfolio diversification, time horizon, financial return and environmental return. The general perception among conventional investors has long been that impact investments – whether environmental, social, or governance – often scale inversely to financial goals, relegating these assets to investments through philanthropy and mission driven investing. However, to increase the amount of capital that will flow into impact and environmental real assets into the future, this perception must be negated through data.

With this rise of impact and environmental real assets investing, investors are demanding not just market-rate financial returns, but quantifiable environmental gains as well. To this end, they are turning to Investing with such objectives of social or environmental return is often referred to as ‘Impact Investing.’ However, this ignores the billions of dollars invested conventionally in environmental real assets that generate environmental outcomes but fall outside the strict definition of ‘Impact’. When referring to the positive change in the environment generated by investments we use the term “Environmental Returns” which includes both impact investments and conventional investments, and emphasizes quantification and reporting. By focusing on how funds currently measure their environmental returns, as well as whether and how investors seek environmental return data, this project seeks to forecast the possible future of metrics in environmental real assets investing.

1.1 - Overview Of Impact Investing & Responsible Investing

“Impact Investments are investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return.”

– Global Impact Investing Network (GIIN)

There is much confusion around impact investing and other terms, such as responsible social investing, sustainable investing, and environmental social and governance (ESG). As a brief history, Sustainable and Responsible Investing (SRI) is a term given to a movement that started decades ago. In the 1960’s in the United States it took hold as civil rights and environmental stewardship issues came to the forefront of American society. The movement has over time called for, among other things, divestments from fossil fuel industries, nuclear power, weapons manufacturers, and government bonds held in countries with significant ongoing social or civil matters. These issues generally fall into three categories, environmental, social, and
governance (ESG). From here we get the term ESG, which is a lens that can be applied across investment types and asset classes. As of 2014, it was estimated that there were USD6.57 Trillion invested using SRI principles, up from USD639 Billion in 1995 with half being in the United States. While in Europe, ESG integration has grown from € 0.6 trillion to € 3.2 trillion from 2005 to 2011. Currently, it is estimated 21.8% of total managed assets globally employ a sustainable investment strategy in some form.

Principles for Responsible Investing (PRI) is another framework often used within the SRI space. PRI is a United Nations-backed governance system for ESG considerations. Investors who have signed on to PRI has grown 10 fold to 1,188 in 7 years starting in 2006. Signatories believe that incorporating environmental, social and governance factors influences their ability to attract capital and the portfolios’ performance. Refer to the appendix for the full list of PRI principals.

While the concept of responsible investment arose in the US in the 1960s, the term Impact Investing dates back to 2008, and implies that the investment fosters the creation of environmental or social returns alongside financial returns. In theory, this is clear to understand; in practice it becomes more nuanced. It could be argued that all funds and investments have environmental or social impact, whether good or bad is up to our beliefs and goals. Predictably, Impact Investing implies positive results. To clarify this, the Global Impact Investing Network (GIIN) identifies three characteristics of Impact Investing:

1. There is intentionality in generating positive non-financial returns as a result of invested capital.
2. There is a return on investment, ranging from return of capital to concessionary returns (below market rate) to risk-adjusted market rate returns.
3. Impact is measured and reported, allowing for transparency and accountability.

The measurement process involves stated objectives, targeted metrics, monitoring of progress, and reporting. “To meet the basic definition of impact investment, we must match intentions for proactive impact with measurement of those results.” This, however, leaves open a number of questions about what types of metrics are to be used within and across asset types, and how and to whom reporting happens.

In an attempt to address the issue of metrics and help create the building blocks of impact measurement, the Global Impact Investing Network (GIIN) developed a catalogued system of metrics that attempted to create a standard language for those measuring impact to talk in. This library of uniform metrics is called IRIS. IRIS only provides standard definitions and acts as the backbone impact measurement frameworks. Currently, GIIN is promoting the Global Impact Investing Rating System (GIIRS). GIIRS is the only tool with any scale that attempts to use IRIS metrics to help rate the impact of investments. However, this tool has seen little in the way of adoption and is largely focused on social impact. Adoption of tools like GIIRS are further challenging because impact investing is incredibly broad.

Impact investments span a number of markets and sectors. It may include investment in small businesses, microfinance, and investments in education on the social side. It may also include investments in energy infrastructure, sustainable products, renewable energy, and in broader climate solutions. Investments can also take a number of forms, from fixed income, to private
equity and venture capital, to public equity, and finally real assets (also sometimes referred to as direct investments). Finally the range of investors within the impact sector range widely. In the impact space we see that pension funds, foundations, insurance companies, family offices and high-net-worth individuals, as well as development organizations and diversified financial institutions have all either identified themselves as impact investors or have set allocations within their portfolio for in vesting for impact.

Impact investing has received a huge amount of attention not only within financial markets, however, it is just a portion of total funds designated for sustainable and responsible strategies. The total global investment into sustainable and responsible strategies is approximately USD 13.6 trillion. A 2014 survey by JP Morgan and the GIIN showed that 124 impact investors intended to invest USD 12.7 billion in 2014. This is 20% higher than what they deployed in 2013. Together all 124 investors manage over USD 46 billion in impact investments. While the respondents differ in each of the years, there is a clear upward trend.

Understanding the characteristics of an impact investing fund is but a starting point for this conversation. Funds and investors have the ability and freedom to self-identify. The characteristics as laid out by the Global Impact Investing Network are not criteria, nor does presence demand the label of “impact”. Funds, and investors are free to market themselves as they see fit. There are a great many funds that are not identified as impact funds that not only create environmental dividends, but do it intentionally, measure it, and report it (described more below). They fulfill all of the characteristics necessary to be impact funds, yet continue to operate by choice in the conventional investing space rather than in the self-identified impact investing space. This is a choice of marketing and branding. These funds, and the investors that participate in them, deserve equal attention as their impact counterparts in the conversation of environmental accounting. As such, we have included both impact funds and conventional investment funds in our analysis.

1.1.1 - Trends Driving Growth in Social & Environmental Investing
The trend toward social or environmental investing occurs on a spectrum. At one end the focus is on decreasing risk factors by incorporating environmental, social, & governance (ESG) measures into an investment while providing competitive financial returns. At the other end of the spectrum, investors are mission driven with investments that are high risk and provide returns that simply preserve wealth at a stop just short of philanthropic giving.
The rise in impact investing has been driven by a number of macro-trends in the financial, geographical, and socio-political landscape:

1. **Shifting Intentions among Investors**: A growing number of investors are looking to make an impact with their capital, this is exemplified by investing trends among Millennials (those born between 1980-2000). 70% of Millennials view their investment decisions as a way to express their environmental and social mission and a similar percentage believe this return can be achieved without sacrificing return\(^v\).

2. **Regulation**: The Paris climate agreement (Paris Agreement) is a clear foreshadowing of increasing government involvement in regulation and involvement in global markets for environmental purposes. Also on the rise is government involvement with the intention to create environmental markets. Wetland Mitigation Banking, fisheries, and Social Impact Bonds are all examples of this government market creation.

3. **Partnerships Across a Range of Players**: Along-side government involvement, emerging partnership models with NGOs, financial institutions, and philanthropic capital providers is seeking to align incentives across value chains in hopes to bring the creation of markets in places where market failures have caused damage to society or the environment. Certifications, fisheries investment, social impact bonds, many microfinance organizations, and other emerging financial investment vehicles require cooperation with organizations at numerous levels and high levels of functioning partnerships to be successful.

4. **Emerging Markets & a Global Middle Class**: As globalization reaches the least developed countries, investing in solutions in these countries can act as a humanitarian act and an investment opportunity. Countless microfinance institutions and developing country venture funds have been springing up over the past decade with the aim of improving peoples’ livelihoods and providing a financial return concurrently.

5. **Resource scarcity**: As market creation is occurring through regulation and partnerships, it is also being created from scarcity. Resources that were once incredibly abundant are limited in availability and as a result some are turning to private markets to allocate the resources more efficiently. Something as abundant as fresh water has now become a financially valuable asset in some geographies.
1.2 - Real Assets & Environmental Real Assets

In the world of investing there are four major asset classes: Equities (stocks), Fixed-income (bonds), Cash and equivalents (money market instruments), and Alternative (Real Estate and Commodities). Each of these adheres to standards and regulations, and has characteristics that distinguish it as an asset class. Real Estate and commodities are considered real assets, as their value is derived from their physical properties. Examples of real assets include real estate, timber, precious metals, oil, infrastructure, etc. This is distinct from financial assets as real assets represent a contractual claim on the asset itself as opposed to claims on commodity futures, stocks, or bonds.

Typically investors include real assets in their portfolios for three major reasons: 1) diversification; 2) inflation hedge; and 3) risk reduction. Real assets help to diversify an investor’s portfolio because they are not subject to the same systemic risk as the rest of the market. They have low correlation with the overall market, due to unique risk-return profiles, isolation from speculation within financial markets, relative illiquidity, and positive correlation to inflation. In times of market volatility it is advantageous for investors to have assets with returns that are not solely dependent on market conditions. Second, in periods of high inflation, unlike bonds, real assets do not lose their value. Therefore, holding real assets is a way to protect against inflation risk. Last, as investors experienced through the economic crisis of 2008, the market can go through periods of huge turbulence and chaos. Just like gold, real assets are considered crisis resistance tools.

Real assets do not come without their downsides. Unlike most financial assets, trading real assets is not a simple process as the investment actually has ownership interest in the land or commodity itself. This difficulty in sale results in liquidity risk form locking up capital for extended periods of time (7-15 years is not uncommon in this space). Knowing the current value of real assets can also be difficult as unlike publicly traded stocks the information is not commonly available to the public. Therefore, understanding the true value of one’s portfolio with a portion of real assets can be a challenge as well.

For this study we have focused on a subset of real assets that we have labeled "environmental real assets." These are real assets most closely linked with ecosystem functions in which funds are relying on the natural resource value and ecosystem service to generate value and cash flows as part of their investment thesis. To that end we identified five environmental real assets to focus on: timber, agriculture, water property rights, fisheries, and mitigation services. These asset types derive their value through human-natural systems within a time-scale in which they can be replenished (as opposed to oil and gas), and carry great potential to create environmental returns (impact).

1.2.1 - Overview of Real Assets Investors

*Institutional Investors*

Institutional investors include endowments, pension funds, foundations, insurance companies, mutual funds, development banks, hedge funds, and sovereign wealth funds. In the US,
institutions control over USD25 Trillion in capital, representing around 17% of all US financial assets. Historically institutions invested predominantly in a combination of bonds, equities and cash. However, since the 1980s when interest rates began steadily declining institutions with rigid spending requirements sought new ways to reach their annualized return of 7-8%. In order to do so many followed the infamous CIO of the Yale Endowment David Swensen and have turned to investing in "alternative assets," which is what real estate and real assets fall under. The Yale model of institutional investing was one of the pioneering strategies of improving risk-adjusted returns by diversifying with the use of alternative strategies. Some of the key principals behind Swensen's investment approach are:

- Take advantage of arbitrage opportunities based on incomplete information in private markets and illiquidity to increase long-term incremental returns.
- Seek lack of correlation with other asset classes, which improves portfolio return.

Swensen's principals and leadership in alternatives investing have had a profound effect on institutional investors' portfolio allocation as today the average endowment invests around 50% of its assets in alternatives. Figure 2 shows current average asset allocation for endowments in the US. Figure 3 shows the trend in how all types of institutional investors have changed their asset allocation over time from 1980 to 2013.

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Description</th>
<th>Asset Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Equities</td>
<td>U.S. domestic stocks</td>
<td>17%</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>U.S. Treasury, Corporate Bonds and high-yield bonds</td>
<td>9%</td>
</tr>
<tr>
<td>International Equities</td>
<td>International Stocks</td>
<td>19%</td>
</tr>
<tr>
<td>Alternative Strategies</td>
<td>Hedge funds, private equity, venture capital, real assets and commodities</td>
<td>51%</td>
</tr>
<tr>
<td>Short term securities/Cash</td>
<td>Cash or Cash Equivalent Securities</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: NACUBO Commonfund Study of Endowments - 2014

Figure 2 Average Asset Allocation of US Endowments in 2014

Common among all Institutional investors is a longer time horizon for investments and very rigid spending requirements. Pensions have obligations to contribute annual payments to employees who have reached retirement age. In the U.S. with the baby boomer generation now encroaching on retirement, pensions are increasingly concerned with funding growing financial obligations with the returns from their investments. Endowments have strict annual program spending requirements that go towards professors’ salaries, campus maintenance and financial aid. A University's ability to remain competitive relies heavily on the success of the returns of its endowment. These characteristics lead institutions to invest in securities and assets that have longer time horizons, less variability (risk), and lower market correlation. They
are also looking for investments that give steady cash flows each year in order to go towards their annual spending obligations.

![Asset Allocations of All Institutional Investors](image)

*Figure 3 Asset allocation of institutional investors from 1980 to 2013. Allocation towards alternative assets and real assets increased from 5% to 20%.*

While institutional investors are often very large and slow to allocate funds to specific sectors, because of their size even a small allocation can make a significant impact in an emerging investment sector. In 2013 a survey by the WEF showed that 6% of pension funds have invested in impact funds/assets. However it also showed that 64% of pensions were dedicated to making impact investments in the near future. Both pensions and endowments have active stakeholders that heavily scrutinize their investment strategy. Whether it is current students, alums or the general pensions holder, institutions receive pressure to be responsible not only fiscally but also environmentally and socially. This phenomenon has played out in the campaigns to divest from fossil fuel based investments many schools’ endowments have come under pressure for. Given the scrutiny they withstand, these investors worry about headline risk and therefore are becoming increasingly sophisticated in the level of environmental and social due diligence they perform before allocating large amounts of capital to an investment.

**Family Offices & High Net worth Individuals**

Family offices are established for the combined investments or trust of a family/estate accumulated over generations and/or created by an individual for the benefit of the family. Individuals are typically considered high net worth (HNWI) when the sum of their liquid assets exceeds USD1 million, and often much higher. In 2014 there were 14.6 million individuals at the HNWI status representing US USD56.4 trillion in capital. The objectives of HNWI’s tend to be asset protection and value preservation. These individuals are trying to preserve and slowly grow their wealth in order to either pass it along to their future generations or donate it through philanthropic efforts. As a result of HNWI’s objectives of wealth preservation, among fund managers they are known to be willing to compromise on return but seek an overall lower level of risk in their portfolios. Due to the low risk and return profile, the average HNWI has the largest proportion of wealth invested in real estate assets (29% on average in 2015).
Because family offices and HNWI’s have a lot of input and control over their investments, they are able to include explicit values and non-financial goals for the management of their financial assets. Increasingly they are looking to specialized investment advisors and funds to meet these objectives. While there is increasing interest in impact investing (and conventional environmental real asset investing), there is still a limited amount of qualified and experienced advisors to facilitate the flow of capital. Further, because the interests and goals of family offices are as diverse as the families and individuals they serve, addressing this investor segments as a whole poses clear obstacles.

**Investment Advisory Service**

In addition to institutional investors and HNWI’s, investment advisory services play an important role in the world of real assets investing. Investment advisory firms are comprised of registered individuals who give advice to and sometimes manage the assets of both institutions and wealthy individuals. They are compensated through a management fee, which can either be a flat-based fee or a sliding fee of around 1% of the client's assets under management. Their job is to listen to an institution or individual’s investment goals and then recommend an allocation strategy and an array of specific investments within each asset type that can work in concert to meet the investor’s overall objectives. They commonly act as a conduit between investors on the buy-side and funds looking to raise capital. As a result, they play a critical role in influencing with which funds large amounts of capital are invested. Advisors can act as a first screen on funds, particularly those with new, unique strategies or those that are focused on impact results in addition to financial returns. Many HNWI’s have aspirations of making positive impact with their investments but are worried that impact funds may be associated with increased risk. Similarly, institutions are increasingly being pressured to make "responsible" investments, however there is a common conception that investing in impact funds means sacrificing returns. Investment advisors are a critical resource for both types of investors to realize their impact investing aspirations without having to sacrifice their investment objectives.

### 1.2.2 - Overview of Financial Structures

**Private Equity Overview**

Private equity is a form of investment in which a fund takes majority control of a company, manages the company for a set period of time (usually 4-7 years) and then sells the company (called the "exit") for a target return in the mid-twenties. At the most basic level, private equity can be seen as a group of investors buying out a company and then using the cash flows from that company and the sale value to pay themselves back with a return. Pre-2008, many private equity firms strategically used large amounts of leverage to amplify their returns to investors, an approach referred to as Leveraged Buyout or "LBO." Post-crisis PE fund's ability to financially engineer their deals has been hampered. Therefore in order to gain returns private equity managers must fundamentally improve the businesses they buy. To do so they rely on working with existing management or implanting their own management to operate the assets in a more efficient or superior manner. PE funds typically charge a fee structure of a 2% annual fee of assets under management and then take 20% of the profits once investors have been paid back and met their target return (called the "carry").
Private equity investment has experienced hot and cold cycles depending on investor trends, both in terms of capital invested and deals done. Given that private equity is considered an "alternative asset" in portfolio allocation, it has benefited from the increased proportion of "alternatives" institutions are investing in. However, there have been cycles where investors view PE as an "overheated" asset type, and investors are less willing to pay the premium for high returns. Figure 4 shows the cycles of capital invested and deal flow in Private Equity over the past 10 years. At the beginning of 2015 there were around 3,300 PE firms headquartered in the US with total investments of USD116 billion. Those firms back 11,130 companies headquartered in the USxxx.

![Figure 4 Quarterly growth in all classes of private equity capital invested in the US and number of deals from 2005 – 2015](source)

**Private Equity of Environmental Real Assets**

Real estate private equity has been a longstanding subset within the overall private equity asset class. However, environmental real asset investing via private equity is a fairly new form that has developed over the past 30 years. The earliest funds took form as timberland investment funds in the mid-1980s. During that time many forest product companies were selling of large tracts of their land for two major reasons. First, they lost a capital gains tax advantage in 1986 and found it financially beneficial to sell off their holdings to tax-exempt investors such as endowments, foundations and pensions. Second, the companies realized the overhead associated with owning the land and managing the forests was not worth the vertically integrated control as long as they could consistently purchase the wood from investorsxxxi. Institutional investors were also looking for ways to hedge against the skyrocketing inflation rates they were experiencing throughout the 1980s. During this time many institutions made direct investments into timberland but private equity style funds with forest management...
expertise (also called Timber Investment Management Organizations or "TIMOs") also formed in order to provide institutions with more efficient vehicles with which to invest in the asset-type. In 2015 TIMOs managed close to 28 million acres of forestland worldwide.\(^{xxxii}\)

More recently throughout the past five years, the private equity model has been applied to agriculture. Merger and acquisition activity and private equity attention on big food companies (i.e. Kraft and Campbell's), coupled with a growing recognition of the scarcity of natural resources needed to feed the ever increasing population has led to the rise of PE funds focused on farmland.\(^{xxxiii}\) In 2015 there were around 33 funds trying to raise a total of USD8.5b. These funds range from being housed within very large insurance companies and banks such as TIAA-CREF or UBS, to farmland-specific niche funds such as Farmland LP or Homestead. Though institutional penetration in the overall farmland market globally is less than 1%, this asset is gaining momentum as an attractive investment strategy for institutions given the steady cash flows and inelastic demand curve of food.\(^{xxxiv}\) A majority of the funds invest in row crop commodity agriculture, such as corn and soy. Others focus on specialty crops or permanent crops that tend to make a higher return but require more management expertise and a longer time horizon.\(^{xxxv}\)

Finally, a handful of private equity funds are beginning to turn to water rights as an investment opportunity. Most follow the same model as agriculture funds, buying and managing farmland in order to control the underlying water rights. Annual cash flows to the fund come from the agriculture crop as well as leasing of water or fallowing programs where applicable.\(^{xxxvi}\) These funds are also betting that over the lifetime of the fund, the price of water will become more incorporated into the land and therefore their exits will be appreciative.

**Public Equity**

ESG integration is one of the main trends in public equity investing. Public equities have long been subject to “Negative Screens” where funds would exclude investments in tobacco, weapons, disputed territories (i.e. Sudan), or environmental issues (Indonesian palm oil deforestation). ESG investing however is any criteria or metric that seeks to include environmental, social, and governance issues in an investment policy. Many funds, even conventional funds have some base level of indicator on ESG performance.

More progressively ESG metrics can be used by a fund to “positively screen” or increase allocation into socially motivated or sustainable companies. This is a niche but growing area with investments firms such as Calvert Investments leading the way with an array of funds dedicated to meeting investors ESG goals with mutual funds allocated to focus on water, renewable energy, low carbon, and social responsibility.

To accompany this there are a host of analytics firms that have cropped up to help funds and investors compare the sustainability of companies using sustainability metrics. The major players in this space are MSCI, Sustainalytics, TruCost, and the Carbon Disclosure Project (CDP). This firms survey companies or extrapolate onto non-reporting companies to create measures of energy, water, and material use and efficiency. These metrics then go to inform who the efficient firms are and who are “inefficient polluters” and then some weighted average is applied to positively or negatively weight these factors into the financial decision making
process. Carbon emissions is by far the most well developed indicator here with clear ties and concerns around climate change driving its measurement and worries of global regulation driving its perception as a substantive ESG risk.

Finally, some large investors are also making waves in boardrooms as the employ activist strategies of purchasing significant market share in companies (1-5%) and then voicing their ESG concerns as an owner of the company. From this lens investors attempt to influence a company from the inside by requesting impact plans be in place and social/environmental targets be set with the threat of divestment if this does not occur.

Fixed Income
Microfinance bond funds, green bonds and Community Development Financial Institutions Funds (CDFI) bonds are all examples of impact forms of fixed income. These bonds usually result in a flow of capital to an impact themed investment.

“Green Bonds” is the term used for a bond that ties its proceeds to environmentally friendly investments. This market has been growing exponentially from just a few million in global value in 2007 to USD36.6 billion by the end of 2014\(^{xxxvii}\). These bonds can be public or private. An example of a green bond is Unilever’s issuance of £ 250 million green bond addressing waste material, resources use, and emissions from existing factories by 50%\(^{xxxviii}\). Environmentally friendly development (such as renewable energy infrastructure in emerging markets) is also a large portion of green bonds with the World Bank issuing USD 6.4 billion in green bonds since 2008 to support development programs designed to address climate change \(^{xxxix}\).

The definition of a green bond, how it qualifies, and what the key measurements are is still unclear as the range of potential investments is huge. For World Bank related green bonds, the World Bank has a supervision process where client countries as part of the loan agreement submit regular reports on project activities, progress, outcomes, and impacts\(^{xl}\). Issuance of green bonds by companies or other institutions however has only come about recently and there has yet to be an established definition on what their requirements are. This is a key focus of many in the fixed income impact investing space moving forward as a definition and metrics will soon be needed to ensure investor confidence.

Banks, advisors, or managers publish the vast majority of the literature examining this space. There is little academic research about environmental metrics and performance in real asset investing. With billions of dollars flowing to impact investments, increasing environmental scrutiny by investors, new vehicles for investments, and new cash flow opportunities from the creation of new markets, environmental real asset investments are poised for huge growth. For many investors and advisors it is a tall order to ask the right questions to make the right investments, and evaluate both financial as well as environmental returns. In order to streamline environmental metrics schematics for investors in the future, a comprehensive analysis of the current metrics used in real asset investing and the motivations behind the practice is necessary. Our goal in this research has been to support the growth of investments in environmental real assets by comparing the environmental accounting efforts of 20+ of the best funds in this space.
2.0 - RESEARCH

We set out to explore the application and use of environmental metrics in environmental real asset investing – how, why, and which metrics funds employ in their environmental accounting. We chose assets that varied in establishment, investor type, duration, and return. These included timber, agriculture, fisheries, water asset rights purchase, and wetland mitigation banks. While there are two non-profit organizations included in our study, where appropriate, their responses are included or distinguished. All organizations or funds are privately held and managed.

Central to our research are the questions why and how do funds collect environmental performance data. We went further and collected data about what metrics they choose to collect, how and to whom they report these metrics, the role investors play throughout the process, and how funds plan on changing their approach to environmental accounting.

![Figure 5 Fundamentals of Environmental Real Asset Investing. Research questions in dotted lines. Direction of cash flow indicated by arrows.](image)

2.1 - Assets Surveyed

2.1.1 - Timber

*Background on asset*

The current investable universe for privately held timber is about USD100 billion in AUM\textsuperscript{xli}. These investments traditionally go through dedicated Timber Investment Management Organizations (TIMOs). See appendix for a list and description of the top 10 global TIMOs. These organizations mostly help institutional investors manage their assets, which occur in the form of both land and forest acres under management. There are also hybrid funds that invest in an array of real assets with timber as part of their portfolio, but due to the unique knowledge needed to manage timber, the specialization of TIMOs is generally the norm in the PE space. Also, some large timber organizations are adopting Real Estate Investment Trust (REIT) structures. REITs are open to a wider array of investors as they can be bought and traded as
financial assets and benefit from favorable tax structures. Because of their classification as financial assets, as opposed to real assets, we have excluded REITs from this study.

Timber has a long history of positive financial returns, as well as low correlation to market trends. Accordingly, it has attracted a range of investor types, most typically large and sophisticated institutional investors. These investors are most interested in hedging (low correlated investments), risk (environmental and financial) mitigation, and proven long-term performance. Notable institutional investors in this space include the Sovereign Wealth fund of Angola with 5% of its funds, or USD250M, investing in forestland, and CalPERS with an ongoing target of 1% (USD2.4 billion) currently invested\textsuperscript{xliv}.

**Performance**

Historical return has been 7-12% annually adjusted return with a steady benchmark of around 8.8% return post fees. When compared to most public equity indices timber exhibits low correlation, with an average beta (correlation coefficient) between 0.35-0.45 \textsuperscript{x liv}.

**Trends**

As of 2015 there were 770 timber investment companies in 74 countries, owning a total of 246 million acres in forest ownership, approximately the area of Texas and New Mexico combined\textsuperscript{xlv}. Since 2010 there has been over USD13 billion transacted with 2014 counting for USD2.6 billion in 45 separate transactions\textsuperscript{xlvi,xlvii}.

2.1.2 - Agriculture

**Background**

Agriculture is another well-established investment asset type that has been available to investors, but is seeing resurgence due to impact investment efforts and dedicated allocations from institutional investors. While the market is it smaller than that for timber, it has been growing faster and is already equal in deal flow. Since 2008 dedicated emerging market PE funds have done USD6b in deals with USD2.5b of capital raised in 2014 alone. The Teachers Insurance & Annuity Association – College Retirement Equities Fund (TIAA-CREF) is the largest US pension fund. It is also manages USD487 billion in farmland around the world, making it one of the largest farmland investment managers\textsuperscript{xlvii}. With TIAA-CREF just opening up a new agricultural investment company, TIAA-CREF Global Agriculture LLC, the pattern of large investors turning increasingly to agriculture and agribusiness is bound to grow\textsuperscript{xlviii}.

There are two primary models agriculture funds employ—either own to lease or own to operate. Funds that own to lease tend to invest in larger amounts of acreage suitable for corn, soy or wheat. They follow a beta investment strategy, relying on steady cash flows from annual lease income and depending on the agreement will also earn a share of the crop revenue as well. Own to operate funds seek alpha by managing the farms themselves, employing higher efficiency growing practices or growing superior crops in order to make higher returns off the crops than compared to the rest of the market.
Performance
Typically returns in row-crop agriculture for the last 20 years range in the mid teens, 5%-8% higher than timber, with comparable volatility. NCREIF Farmland Index of all farmland real estate investments calculated a ten-year annualized return of 17.57% from both annual income and land appreciation. Permanent crop funds have garnered returns in the high teens around 18.3%.

Trends
Given that currently, institutional penetration of global farmland is less than 1% there is much opportunity for further investment and therefore formation of more agriculture funds. Management expertise in agriculture is key however, and issues like food safety, worker rights and cyclical commodity pricing are causing investors to continue to proceed cautiously while seeking managers with good track records.

2.1.3 - Fisheries

Background
Fisheries, unlike many of the other real assets described in this paper, is still in its infancy as an investable real asset. Despite this there is a clear potential for both return and impact in the future. Marine capture fisheries contribute US USD270 billion to the global food value chain. This resource is however under global pressures of overfishing (fishing past the replacement rate of the fish). Because of this “investing” in fisheries is of growing interest to many in government, business, impact investors, and the NGO community.

The objective of investment is transitioning from a tragedy of the commons where fisherman can take as many fish as they want from the environment to a sustainable fishery through creating investable and exchangeable fish catch permits. There is a market for these permits and only as many permits would exist as there were allowable fish within a population and area to be caught before exceeding the replacement rate. Under this model, the prices of these permits stabilizes at an equilibrium price where fisherman buy the permits and passes the cost to the entire fish value chain accordingly.

This model has a clear functioning example in California where regulation and support from the Nature Conservancy has made 3.8 million acres of sea a fish with permit zone. The Nature Conservancy owns the allowable catch permits and manages the asset (the fish in the ocean) by leasing permits to fisherman who are eager rebuild their livelihoods after the fishery had collapsed.

Performance
As fisheries is an emerging asset there is no established historical performance and its support from the NGO community shows that it is not yet reached a level of risk-return suitable to most investors beyond the impact-first motivated investor.
Trends
Fisheries investing is in an adolescent phase of what may eventually resemble the strict regulatory structure and supporting third party monitoring/certifications of wetland mitigation trading. In order to mature, fisheries investing needs strong regulatory bounding and systems of monitoring to ensure that incentives are aligned among stakeholders. In current forms funding originates from pioneering impact investors as the risk return profile has little history and does not yet match the needs of conventional investors. Moving forward, leveraging capital from different investors across the spectrum of conventional to philanthropic will also assist in this maturation process.

2.1.4 - Water Rights

Background
Water rights investing is when an investment management fund buys a right to water use either through purchasing the land associated with the underlying water right or, where possible, directly buying the water right itself. A limited amount of private equity funds have been working to create water rights portfolios in resource-scarce area where the supply-demand dynamics inherently make the water valuable. These funds then manage the land and water, taking advantage of opportunities to lease water to other users for cashflows and then sell the asset upon exit once the underlying value of the water has been realized or appreciated. Options to directly invest in water are limited. Unlike other commodities, water does not trade in the US and there are no ways to buy water futures because of how localized it is. Many current actors in the industry are investing with a long time horizon and with the expectation that the creation of new regulations, particularly in the Western part of the US, will create opportunities for increased securitization of water.

Funds focused on water resources have sought exposure through other vehicles in addition to direct investing and private equity. Investors can invest indirectly in water through hedge funds that long and short public equities of companies positioned to provide solutions to water resource constraints into the future. There are also water-oriented mutual funds and exchange traded funds.

Performance
Water private equity funds are too nascent for there to be data on returns as many have not yet exited their first funds. However, water focused equities have generated a return of 16.9% annually over the past 20 years. Water ETFs have generated returns ranging between 6.2 - 10.6%.

Trends
There are an estimated 10 private funds that specialize in water globally. Small venture capital funds have also begun to emerge that provide early stage funding for technology firms developing efficiency applications in water use. Many focus on the agriculture-water nexus, recognizing that water will be a major limiting factor in our ability to feed the global population into the future. Another emerging trend in the water investment realm is wastewater. Funds
are increasingly looking into ways to recapture flows out of wastewater by buying and managing treatment facilities in water constrained regions.

2.1.5 - Wetland Mitigation Banks

**Background**
Wetland mitigation banking is the creation, enhancement, or preservation of a stream and/or wetland for the purpose of offsetting adverse impacts to other similar areas. The industry was established by the Clean Water Act of 1972 followed by 81983 guidance regulation, and by federal regulatory guidelines set forth most recently in 2008, creating the market as it exists today. The creating and permitting of a mitigation bank creates compensatory mitigation credits, which are sold to States, Municipalities, and developers for the subsequent adverse effects of activities such as road construction and real estate development. Mitigation banking is often preferred to other forms of off-set as it occurs earlier in time and is often of higher quality than the degradation, generating a net positive effect.

The mitigation banking industry is overseen by the US Army Corps of Engineers. They determine both the amount of offset needed for compensation, and the amount of credits restoration and preservation creates. They focus solely on the hydraulic, biological, and chemical processes of the streams and wetlands they are regulating, with the intent of providing the industry with sound environmental effects.

**Performance**
Mitigation banks are funded in a variety of ways, including syndicated private funding, private equity funds, and bank debt. Returns, depending on the size and geographic market the bank is located in, can range from competitive market rate returns in the mid-teens, to 2x-3x on investment. The number of banks in the United State increased from 46 to over 1,800 over a 10 year period ending in 2013.

**Trends**
Mitigation banking has seen significant growth over the last 10-15 years. Credit sales have been relatively stable for the past 8 years, with the number of credits per transaction increasing. Inventory of unsold credits is on the fall, dropping 10% over 7 years ending in 2013. As of 2013 there were more than 1,800 mitigation banks (404 and ESA) registered in the Army Corps’ information tracking system, RIBITS. This high-growth period has been marked by high demand from activity in adjacent markets (housing development), policy changes (2008 Mitigation Rule), and private investment and increasingly sophisticated mechanisms.

With increasing attention at all levels being paid to mitigation banking, evidenced by the DOI’s formation of the Natural Resource Investment Center, and other efforts around the country, we can expect systematic enabling of new mechanisms to encourage the flow of investment and the growth of this still adolescent market.

While we focused on traditional 404 wetland mitigation services, other off-set markets such as water quality trading, and endangered species habitat banking are starting to build. Trends
have been slow as investors, managers, and regulators just begin to structure the market. We expect to see tremendous growth in these markets over the next 5-10 years, just as in traditional 404 mitigation.

2.2 - Methods

Our methodology primarily consisted of survey interviews, given in person or over the phone to fund managers, President/CEOs, or Sustainable/Responsible Investing Managers. Our questions were designed to reveal how funds measure environmental metrics, the reasons/motivations for recording or not recording, how these metrics are reported and to whom, and what role investors have in the recordation and reporting of such metrics. The overarching goal was to explore the range of recording and reporting methods used for environmental metrics in real asset investing.

Interviewees were asked to answer questions subjectively on behalf of the fund. We asked that anything said be in reference to fact and should not be based on one’s own opinion. Institutional Review Board submission is needed when “conducting research with human subjects ...about whom an investigator ...obtains data” . As we were not collecting data about our participants, rather about the funds they managers, our research and data collection was exempt from Institutional Review Board (IRB) standards. For example we would ask fund managers:

- ‘Do you have a plan for changing our environmental accounting practices in the foreseeable future?’; instead of, ‘what do you hope to see change in the field of environmental accounting?’

We then analyzed the data for disparate and uniform trends in key areas of interest, aggregating the data based on investor type, fund structure, asset class, investment thesis, and investor type.

Because of the proprietary nature of much of the information we gathered, the data have been aggregated and anonymized throughout the analysis and presentation. The following chart depicts the types of funds represented in the survey across environmental asset type and fund vehicle. The green checks depict the types of funds that exist in the investment world and the red checks depict the types of funds we interviewed. Our IRB Disclosure Statement and an example of our survey are included in the appendix.
2.2.1 - Questions
The surveys were conducted over 45 min and each fund manager was asked to provide the fund’s perspective on 10 core questions that had implied a few additional questions that occurred in discussion these questions could be broken into three categories and are as follows:

- **Investors:** What trends are fund managers seeing among their investors? What are the fund’s investors requesting from them in terms of metrics, stories, investment screening? What are the differences in return and impact expectation among different investors?
- **Metrics:** What metrics do funds use to measure impact? Are there any standards, processes or certifications funds employ? What motivations do funds have for collecting or not collecting metrics? How are metrics used to communicate to investors or manage the asset? How do you see your metrics changing over the next 10 years?
- **Funds Investing in the Asset:** How is the fund marketed to investors? Are there other leading funds in the space and if so what are they doing? Are some funds more impact than others or is there segmentation that assumes trade off in impact and return? How does the fund screen deals for environmental impact in the deal pipeline?

3.0 - RESULTS & DISCUSSION
There were three major findings that emerged from this research:

- Despite early efforts to standardize, disparate metrics within and between asset types led to funds competing on environmental accounting and reporting efforts, instead of environmental performance;
- Environmental accounting was motivated by various forces that are either internal or external, however self identification as impact or conventional did not correspond to environmental accounting efforts;
• Investors influenced what funds measure but are increasingly turning to 3rd party advisors to interpret impact. However, many 3rd party investment advisors did not have the environmental expertise to determine highest environmentally performing funds and direct capital towards them;

Though presented individually, all three of these results were closely linked and shaped by similar forces within environmental real asset investing. Each is covered in depth, including the implications and significance of them in the following sections.

3.1 – Variation Among Environmental Metrics
There was very little uniformity in the metrics funds employed, both across and within asset types. Outside of the highly regulated mitigation banking industry, funds employed disparate metrics. In their formation and adoption, metrics were not created for the sake of comparing environmental performance of funds, but rather for satisfying diverse internal goals and external requirements. We found strong links between funds’ motivations to collect environmental performance data and the metrics they used. Three major categories of metrics were used:

1) Environmental metrics that are required by a regulating body;
2) Voluntary certifications that require proof of performance using specific metrics and parameters;
3) Voluntary metrics used to achieve mission oriented, performance, or marketing goals, and;

There were no metrics that cut across all asset types, and very little overlap within asset types. In agriculture, funds were employing very different metric schemes as well as creating their own distinct sets of metrics. One fund was working closely with NGOs to pilot a new index designed specifically for specialty crops complete with biodiversity metrics in addition to carbon, water and soil. The fund was additionally creating its own social metrics to track labor aspects associated with farming operations. Another agriculture fund was piloting a completely distinct metrics scheme that had been developed through a partnership with food CPGs and retailers. That fund also put a lot of effort into tracking soil quality and nutrient loads throughout both the due diligence and ongoing management processes. See the appendix for the full comparison between the two funds metrics schemes. As these two specific agriculture funds indicated, in the absence of strict regulation or strong, united certification schemes, the metrics that funds use were varied.
As is generally practiced throughout timber and agriculture, many funds elected to subscribe to environmental certifications, such as Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), National Alliance of Forest Owners, USDA Organic, USDA Good Agricultural Practices & Good Handling Practices, and others. We found that funds used such certifications because they are generally accepted as industry standards, and because they are relatively easy to communicate to investors and other interested parties. Nearly all of the timber and agriculture funds surveyed employed at least one of these certifications voluntarily. In the case of agriculture, being certified USDA Organic also allowed one fund to get a higher premium on their crops, particularly in specialty and permanent crops. Though certification of an asset is voluntary on the part of the fund, when used, fund must adhere to specific performance thresholds. Like most certifications, the criteria are a mix of environmental, social, and governance issues. Certifications did not provide points of comparison between funds within asset types, nor among asset types. Section 3.1.1 covers certifications in more detail.

Many of the funds we spoke with employed entirely voluntary metrics beyond certifications. These included many of the timber and agriculture funds that also carried certifications, but elect to record other metrics above what is needed. We found that funds typically started by using IRIS metrics, as promoted and managed by the Global Impact Investing Network (GIIN), and often tailored them to fit the specific nature of the asset or investment. IRIS metrics have been created by an internal GIIN Advisory Board, 3rd party consultants and experts in an open and iterative process to create an exhaustive list of ESG metrics for funds to employ. With over 400 metrics, IRIS functions more as a library for funds. Most funds use metrics developed in house, often using IRIS metrics as a starting point. Specifically, the advisory firms, agriculture funds, and half of the timber funds we spoke with employed voluntary metrics – either IRIS or self-developed – in addition to certifications.

Only mitigation banks, which are required by regulation to collect environmental metrics, could be adequately compared to each other. The US Army Corps of Engineers (USACE), and
Interagency Review Teams (IRT) require monitoring reports for mitigation banks and many employ similar metrics. Monitoring includes assessments of permanent vegetation plots collecting data on species, heights, density, and number of woody species, volunteer species, and invasive species. Stream channel stability and hydrology are also measured, using reference stakes, longitudinal cross-section profiles, bank height ratios, and flow gauges. Water quality and macroinvertebrate populations are also monitored within the restoration site, specific parameters are laid out for each individual bank, but often include pH, dissolved oxygen, and conductivity\textsuperscript{lvii,lviii}.

Of all the funds we spoke with, one did not collect environmental performance data. It was their experience that investors were not asking for them and was not worth the cost or effort.

![Figure 8 Distinctions Among Environmental Assets Leading to Unique Metrics and Certifications.](image)

### 3.1.1 – Role of Certifications in Environmental Real Assets Investing

Throughout our research we found consistent use of certifications in both timber and agriculture investments. We encountered four main certifications within the timber industry, with FSC and SFI being the most prominent. Within agriculture, four separate certification schemes were used, all with varying frequency, and none dominating the market (see Figure 9).

Managers certified their assets to:

- Adhere to industry standards;
- Achieve access to new markets/product differentiation;
- Satisfy investor requirements; and
- Satisfy buyer requirements
A certification, as it pertains to real asset investments, is an endorsement that confirms a particular set of characteristics. These characteristics are stated in the certification requirements, measured across ESG considerations, and monitored for compliance. All prominent certifications are verified by 3rd party auditing bodies.

Certifications are industries’ attempts to accomplish two goals. The first is to provide some incentive to meet environmental standards. This incentive provides access to new market segments and the ability to extract a price premium based on the certification, and/or obtain social license to operate (as one timber manager stated). In timber and agriculture, these certifications are often standard and requisite for attracting capital and being competitive. While they are in theory, voluntary certifications, they often comprise upwards of ~80% of the assets owned by the funds we surveyed. The second goal is to provide some form of standardization. While they apply standard metrics through their certification process, they do not allow for competition based on those metrics. The certifications that exist generally lack performance gradation. Assets and funds either adhere to the requirements or do not. As such, these certifications provide no means for funds to compete on environmental outcomes. Those that comply have no additional incentive to exceed the standards set by the certifying body.

For the majority of the timber managers we spoke with, the main motivation for achieving certification was to adhere to industry standards. The two most prominent timber certifications amongst our surveyed funds were FSC and SFI. Certifications were so common throughout the industry that they were not used to achieve market differentiation. The FSC certification was established in the 1990s by business, environmental, and community leaders in an effort to achieve the highest and truest value of timberland. The Forest Stewardship Council, for instance, has 10 principles that have to be met, containing 57 criteria and metrics that have to be met and recorded in order to achieve certification. The certification extends through the supply chain and includes environmental, social, and governance considerations.
The certification is voluntary, requires periodic audits, and has individual certification schemes for 80 countries. The Sustainable Forestry Initiative (SFI) certification, often used in place of or in conjunction with FSC, was the industry response to FSC certification starting just 1 year after. While there is substantial overlap in the requirements for certification, SFI emphasizes research within working forests and is program-based, whereas FSC is performance-based and generally considered environmentally and socially more stringent. Both certifications, regardless of how stringent they are on ESG factors, lack gradation. There is no way to compare assets with the same certification.

In agriculture, certifications similarly lack the structure that allows for comparison and competition. Throughout our research we encountered four certification schemes, none significantly more frequent than any other. Who assigns the certification and audits the assets was the major differentiation between agriculture certifications and timber certifications. Whereas in timber we see exclusively independent 3rd party non-profits providing the service, in agriculture we saw the US Department of Agriculture, schemes imposed by supply-chain buyers, and independent non-profit organizations. This is, in part, because of the large number of agricultural products, each requiring their own tailored set of metrics and standards.

Of the other asset types surveyed, only fisheries have certification programs. Neither water rights nor mitigation banking were structured in such a way as to allow for certifications. However, because investment in fisheries was only just beginning, we did not observe the use of any certification.

While we saw realized positive impact come from the use of certifications, we are critical about what they actually accomplish in the industry. They fell well short of providing a platform on which funds can compete on environmental performance, and in many cases were so ubiquitous they are almost meaningless. For timber, nearly all of our funds had certified assets.

3.2 - Why do Funds Measure?
What metrics are used depended entirely on why funds and managers measure. We found 7 motives that drove funds to employ metrics. These can be grouped into two categories: Internally motivated, and externally motivated. Figure 10 is a graphical representation of funds’ reasons to measure separated by internal and external factors.
3.2.1 – Fund Positioning as Impact or Conventional

Prior to reviewing results of the survey, we hypothesized that funds that position themselves as impact would collect more environmental data and have more sophisticated metrics schemes. We found that some of the funds with the most advanced data collection did not position themselves as impact. In general, not all funds that collected and report environmental data identified as impact funds, nor did the inverse hold true in some unfortunate cases. Funds have the ability to identify and market themselves however they see most fit for their objectives. Simply, some emphasized the impact, while some did not. Figure 11 shows the breakdown of funds interviewed by asset type and whether they were marketed and positioned as impact or conventional.

<table>
<thead>
<tr>
<th>FUNDS INTERVIEWED</th>
<th>Total</th>
<th>Timber</th>
<th>Agriculture</th>
<th>Water Rights</th>
<th>Wetland Mitigation</th>
<th>Fisheries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Impact</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>0</td>
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<td>0</td>
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<td>NA/NGO Supported</td>
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<td>0</td>
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</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

The results of our survey revealed that there were two prevailing reasons why a fund chose to position as “impact” or “conventional.” Funds that chose to position as impact feel that marketing themselves as impact may increase access to certain pools of “impact” capital. Many public pensions and endowments now have bylaws on the percentage of designated “impact” investments they must have capital allocated to. Some funds asserted that this is a growing niche, and early entry will prove valuable as investors increasingly allocate capital to impact.
investments. In order to be able to tap into this earmarked “impact” capital, funds chose to position themselves as impact funds.

Other funds, in an effort to attract conventional capital, deemphasized impact while emphasizing competitive returns. Many conventional funds believed their investors viewed impact as coming at a direct financial trade-off. One in particular, a mitigation fund, stated that regardless of the monitoring efforts, the reporting, and environmental performance, the fund emphasizes its market-rate returns above all else. This is particularly significant, because mitigation relies on verified environmental performance with regulatory oversight. Not having to broadcast impact or environmental accounting efforts because of the regulatory oversight may be one distinct advantage of the mitigation industry’s structure.

These opposing beliefs represent a tension among funds wanting to access different forms of capital. It is therefore not accurate to assume that funds positioned as impact put more resources or effort into metrics than those positioned as conventional.

3.2.2 – External Reasons to Measure

Regulatory Requirement
In mitigation banking, monitoring is required for credit release and revenue generation of mitigation banks. There are thresholds to be met that trigger the release of mitigation credits to the firm. If monitoring reports indicate poor performance of the streams and/or wetlands, the USACE and the IRT can withhold credit releases until performance criteria are met. The environmental function of the stream and wetland is central to the industry and the ability of mitigation banks to earn revenue.

Large portions of operational costs were allocated to monitoring. Mitigation firms indicated that monitoring costs comprised between 5%-20% of full project costs. It is important to note that the higher end of this range is a product of long-term management fund (endowment) requirements, which are not uniform across the industry. It is notable however, that among all of the real asset categories we surveyed, mitigation banks are the only funds that are regulated to monitor into the future.

Mitigation funds reported that their investors were not generally concerned with the data from monitoring. Managers therefore, provided investors with stories and images to communicate the environmental uplift of their investments. Perhaps because achieving monitoring goals is fundamental to the funds’ cash flows, investors were content to not oversee the environmental effects as the regulatory agencies provide stringent oversight. For regulators, it is not enough to see the presence of measurements. They are wholly concerned with the results indicated by the data. It may be that only in a regulated industry are funds guaranteed environmental uplift, as that is the foundation of the industry.

Investors Require Metrics
Particularly timber and agriculture funds developed metrics schemes and maintained ongoing monitoring because due to investor requirements. Many have had a history of investment from
European institutions that tend to have very rigorous reporting standards. One timber fund relayed that one of their Dutch investors required a 14 page ESG questionnaire during the due diligence phase. Had this fund not previously measured, it would have been extremely expensive and onerous for them to put together the environmental information in order to access that capital. By establishing measuring processes, the funds were able to compete for European pensions, sovereign wealth funds and development banks that have detailed, bureaucratic reporting requirements and a higher level of ESG sophistication. These funds were also positioning themselves to tap into capital from U.S. institutions and endowments that are making increasing commitments to positive environmental impact. One manager said about why they collect and report environmental data was that they are simply required to report on things they have been doing for years – evidence that investors and the public are responding to “heightened conversation and discourse over climate change, poverty, people, and environment.”

Like some institutional investors, HNWIs often had similar demands of managers and advisors. Because dealing with multiple HNWIs and fund managers can be arduous for both parties, wealth advisors play an important role. They are increasingly being asked to be environmental intermediaries, not just financial advisors. While many advisors are educated and experienced in financial advising, it is clear from many of the managers we spoke with that true and comprehensive knowledge of the underlying asset was missing.

**Required by Supply Chain Partners**

We found, in one case, that a supply chain partner required that producer(s) meet certain standards. In this case the direct buyer had established sustainability criteria they imposed on producers. This does not meet the criteria of certification, but does provide a unique insight into the powers of consumers and suppliers of agricultural and timber products.

### 3.2.3 – Internal Reasons to Measure

**Marketing**

As the area of impact investing has grown over the past decade, certain funds have positioned themselves in the intersection of environmental impact and real assets to fill investor demand in a new niche. They raised funds around “sustainable” or “environmental” real assets and have stated commitments in their Private Placement Memorandums (the document that funds use to communicate their investment thesis and plans to investors) towards environmental practices and outcomes. To support their stated commitments funds either chose to be externally verified through existing certifications (i.e. FSC, USDA Organic, SFI) or they created their own voluntary environmental metrics to communicate to external investors and partners.

Certifications are a ‘known quantity’ for investors and are easily communicated. Funds subscribed to environmental certifications in order to clearly and simply signal to their investors that they follow through on stated environmental commitments. Having an outside body auditing may be seen as a stronger verification mechanism in the market. In order to undergo the annual audits to maintain certification of their assets, funds measured environmental outcomes themselves and with the auditors.
The funds that did not choose to be certified but have created their own metrics system stated doing so because of the unique characteristics of the asset they invested in and the geographies they operate in. In their view, the limitation of certifications was that in real assets there was no “one-size-fits-all” schematic that properly tracks the key environmental outcomes and therefore they created their own metrics to track the outcomes they and their investors were most interested in.

Marketing allows for increased access to different pools of capital. We draw the important distinction that marketing environmental monitoring is not the same as marketing positive environmental performance. The former refers to the procedures and metrics used to guide data collection – the second is interpreting the data and communicating those findings. Most funds marketed their procedures and policies around monitoring, rather than what the data suggest as performance. When asked directly, one timber manager agreed that investors were generally more focused on the presence of principles and procedures than the results (positive or negative). Perhaps the first step to positive impact is quantification and monitoring, and in the evolution of environmental accounting we will see investors scrutinize the impacts more than simply the monitoring efforts.

Someone critical the marketing of impact investing and sustainability in capital markets noted that “what were just words are now becoming actions.” Despite the suggestion that much the marketing out there has little truth behind it, this statement does express that, while actions might come slower than words, funds are making good on their marketing strategy.

**Mission**

Separate, but often closely related to marketing, is the internal mission of the fund. Written into many of the funds’ mission statements, and reiterated by managers and advisors, was the intent to make both environmental and financial contributions. A timber manager spoke very plainly saying, “we consider ourselves stewards of our assets (trees & land), investments, this company, this earth and a way of life.” Whether a fund was marketed as “impact” or not, funds maintained internal commitments to stewardship and environmental outcomes. For some this commitment seemed to be for risk mitigation purposes as the outside public and investors continue to scrutinize environmental outcomes more. For others, the commitment helped to engage employees, partners and stakeholders. In either case, having an internally stated mission of environmental stewardship led these funds to take measures to track their environmental performance against their stated goals.

**Tool to Improve Asset Performance**

Some funds that owned and operated their assets measured in order to improve the performance of their assets. Particularly for assets in which the environmental health of the resource leads to improved yields (forests and farmland), creating a baseline of the asset’s environmental condition through metrics and then continuous measurement and tracking helped asset managers operate towards both higher financial returns and better environmental outcomes. For funds where assets were held for longer durations (10+ years), measuring helped create value realized upon disposal (sale) of the asset. Other funds sought arbitrage opportunities through data collection and monitoring. By changing management based on performance metrics, some funds believe they can provide above-market returns to investors.
Regardless of why funds collected environmental data, we found that both the act and results of monitoring produce three main results.

• Monitoring may improve asset performance leading to better financial performance in the market.
• Marketing as conventional or impact, regardless of monitoring efforts, can attract different pools of capital.
• Monitoring, in the case of mitigation banking, is required for participation in the industry.

It is important to note here, however, that metrics collected for internal reasons were not always reported to external audiences such as investors. Monitoring and reporting are two separate activities that should not be seen as one in the same. For competitive advantage reasons, some funds chose not to communicate every metric they collect. Some managers determined that the data they collect are beyond the investors’ level of environmental sophistication and concern. Communicating too many metrics back to the investor could cause fatigue.

**Due Diligence**

When deciding which assets to invest in, funds engaged in lengthy and detailed due diligence periods before acquiring the asset. Most of the funds in our survey did not cite using environmental metrics as a substantive part of their due diligence process. Many said that measuring impact occurred only after the asset had already been acquired. Impact metrics were measured in comparison to a day-one baseline. A few funds however did cite environmentally focused methodologies that stood out as unique:

1. **Case #1: Internal ESG Pre-Screen From Agricultural Fund:** One management fund used an internal classification of rating potential investments as *Excluded, Neutral, Light Green,* or *Dark Green.* Beyond applying exclusions or examining risks, this fund bucketed potential investments on their ability to create impact and align with the mission of the fund. (See Appendix for further details.)

2. **Case #2: Focused on Compliance with Certification in Timber:** One timber fund we analyzed said that the FSC certification acted as a good proxy indicator for both risk-return profile and impact. For this impact fund, past and current certification allowed for clear reporting to investors. This fund had in place further restrictions to ensure assets did not contribute to deforestation or erosion.

3. **Case #3: Mitigation Bank Focused on Total Potential Off-set Credits:** Revenue for this mitigation fund was a function of market price for their off-set credits, as well as the number of credits available from restoration. The US Army Corps. would determine the amount of ecological uplift from restoration and allocate credits accordingly. This drove the mitigation fund to find those assets where restoration can result in the greatest impact. This had direct bottom line effects.
4. **Case #4: Two-Staged Screening Process**: One impact fund said that it used two screenings. First, the asset manager (not fund manager) would qualitatively assess the asset based on past investments and experiences. Second, the fund used an internal framework to ensure that the asset would contribute directly to the stated outcome of the fund. With this, the fund had specific “impact outcomes” alongside financial outcomes. Feasibility of these outcomes was evaluated before and throughout acquisition and management.

This last case identifies a very large gap in environmental accounting, between asset managers and fund managers/advisors. Asset managers are those who physically manage the crop, timber plantation, fishing vessels, etc. We found that most fund managers, and nearly all advisors had very little experience working with the environmental real assets they are capitalizing. However, not only were they providing the investment capital, they required sophisticated monitoring and reporting. As Case #4 makes evident, it is very important to have people with deep knowledge of the asset, managing it on the ground and communicating the significance of the data.

Some funds stated that as they are currently only piloting metrics within their fund, which they saw as the first step to eventually incorporating metrics throughout the due diligence, investment, and management phases. Further, some expressed interest to test metrics for correlation with asset performance.

We weren’t the only ones asking ‘why measure.’ In conversations with managers and advisors, we found that the question was being asked internally just as often. This exposed a huge amount of uncertainty in the practice of environmental accounting. Doubt persists within companies and funds, and within the larger industry, as to why measuring is important and what it might contribute. One manager suggested that environmental accounting may only be interesting from an academic point of view, while in practice its value (if any) might not be realized. Certainly there are positive (and negative) environmental impacts as a result of direct investments, but is there value in monitoring and measuring? Do funds that monitor and report do better than comparable funds that don’t? What does it mean to do better? These questions arose in internal conversations. Enough people believe environmental accounting adds value, because they incur large costs to measure and report. For some, mitigation bankers specifically, they saw required monitoring and reporting as a barrier to entry for new funds. Aggressive monitoring and a high environmental threshold, validated and enforced by regulatory agencies “professionalizes what we do,” shared one mitigation banker. Another fund offered that reporting may have little to do with communicating the environmental impacts generated by the investments, but rather was a positioning tool for the fund in the burgeoning Natural Capital Economy. While there were many varied responses to why fund measure and report environmental impacts, to hear that some managers and advisors were asking questions internally without clear answers, showed the under-developed nature of environmental accounting.
3.4 - Investor Interest In Environmental Accounting

Investors of all types, both within and across assets were asking for disparate metrics, varied forms of reporting, and mixed performance outcomes. We found that there was no standardization in the requirements of investors. As reported by the funds, investors were more concerned with presence of procedures, metrics, and reports, than with the environmental performance illustrated by those data.

Investors played a critical role in how funds select, conduct, and report their environmental accounting efforts. We asked funds how interested their investors are in the environmental impacts of their investments. We found much variation in both the degree of environmental scrutiny and what they require from funds. There were some trends within investor segments, but generally there was little alignment in what was required within and between investor and asset types.

Perhaps more interesting than the degree to which investors were concerned with environmental outcomes, was why some investors were more interested than others. It was clear from funds’ responses that the requests from investors around environmental accounting are all over the map. The most environmentally committed groups of investors tended to be high net worth individuals and European institutional investors. HNWIs and family offices often had a stated mission and screen investments based on their commitment to impact, as did European pensions. Both focused on wealth preservation tending to favor lower risk-return profiles. Unlike endowments or pensions however, HNWIs did not have annual spending requirements. Both investors represent “patient capital,” which typically aligns well with the prolonged timeline associated with real assets.

Additionally, HNW offices were usually comprised of just one or very few investor(s) and were therefore not accountable to constituencies or unions. HNWI’s tended to be very interested in the environmental impacts and outcomes of real assets funds, ensuring close alignment with their mission. This does not mean however, that they were willing to lose money or take on additional risk. As one fund manager put it, HNWIs “like the impact story to brag about to their friends but don’t want to lose money while doing it.” The same manager stated that family offices seemed more willing to compromise on return for more impact but were not be willing to take on more risk. This was consistent with a HNWI’s general mission of wealth preservation.

Funds surveyed reported that European institutions, specifically German and Scandinavian clients, were very proactive regarding environmental accounting and reporting. Given that these European institutions manage money for an environmentally conscious populous, it is logical that they will be the most concerned with environmental impacts and more rigorous in their reporting requirements. See appendix for key quotations from fund managers on investors’ level of interest in environmental outcomes.

Foundations’ and Development Banks’ tended to be concerned with environmental impacts on specific aspects of the environment. One fund manager observed that foundations are increasingly trying to match their investments with the mission of their foundation, therefore fixating on certain components of overall impact. Similarly, development banks have specific
objectives. Though they are concerned with impact, they too tend to focus on specific parameters rather than the broader environmental impact.

According to the funds we surveyed, institutional investors in the U.S. tended to differ in their level of interest in environmental outcomes. See appendix for a schematic of investor level of environmental interest plotted against willingness to compromise on returns. Sustainability stories satisfy some requirements for annual reports. For university endowments, pressure to “divest” from certain perceived environmentally negative investments such as fossil fuels drives their investment strategy. In the midst of this heightened scrutiny, many institutional investors search for alternative institutional grade investments that can deliver neutral or positive environmental impacts. However, given the reality of universities’ spending policies in order to fund programs and scholarships, pay professors, and grow, they may not be willing to compromise on target return.

3.4.1 – Investors’ Requests for Environmental Reporting
Investors with broad public constituents, such as pensions, sovereign wealth funds, or development banks tend to have institutionalized due diligence questionnaires around environmental impacts. Funds referred to this as having to “check the box.” Many pensions now have stipulations written into State policy around “impact” allocations. However, we also heard from funds that once that box is checked, the regular reporting requirements became less onerous once the pension had decided to place money with the fund. We will revisit it shortly.

HNWI’s and Foundations ask for environmental impacts as a series of one-off requests regarding the aspects that are closest to the individual’s values or foundation’s mission. These investors have less widespread public scrutiny and therefore are not as concerned about potential risk issues that could arise from environmental impacts. We did hear that HNWI’s tended to want ongoing information (whether that be quantitative metrics or qualitative stories) regarding the environmental performance of the fund in which they have placed their money. This is likely because their decision to place money in a positive environmental impact fund stems from a personal value rather than a sanctioned policy.

It was often stated that there was often more upfront requests coming from investors than ongoing performance reporting. There are many indications that investors of all types are more concerned with the presence and use of metrics, monitoring procedures, and reporting methods, than they are with the environmental performance outcomes. This is a major finding. It is often said in business that what gets measured gets managed. Perhaps we have found an instance where this does not hold. It points to a severe lack of scrutiny and sophistication on the part of investors that they, as one manager put it, “they don’t want to take it further... we have a process, [the process] is often enough for investors.”
3.4.2 – Role of Investors in Environmental Accounting
Throughout our examination with fund managers of investors’ roles in encouraging environmental accounting, the question arose of how much environmental sophistication should investors be expected to have. Should investors be expected to drive environmental accounting efforts throughout the market? They clearly have the most control over where capital flows, but should they themselves be responsible for the validity of a fund’s environmental outcomes? This in turn forces us to ask whose role is it to provide, standardize, simplify, and compare environmental impact data and investor stipulations. One the one hand investors are asking for disparate measures and procedures, often deemphasizing performance. As a result funds were receiving requests from investors and other interested parties. On the other hand there were no standardized metrics or reporting methods which managers and investors elect to use or compare. While opportunities to standardize exist around metrics such as The GIIN’s IRIS metrics, we observed little to no standardization. Without this there can be no comparison and competition on the basis of environmental performance. Who’s job might it be, and is comparison even the point. This may increasingly be the future role of investment advisors or an opportunity for a third-party environmental verifying body.

A number of funds shared concerns about investor involvement as well. They noted that institutional investors have driven the industry to where it is today. Bureaucratic responsibilities, and burdensome expectations such as spending requirements and risk management, mean that they move and mature very slowly. High-net-worth offices are highly individual and difficult to aggregate, and there was almost no information on retail investors in the impact investing space. The major question managers have about investors was, ‘what level of sophistication can we expect from them around environmental accounting?’ While there are changing expectations from investors, such as risk-adjusted return, time horizons on investment, and impact reporting, do investors really know what they want in terms of environmental performance, and can funds give it to them? One manager identified what she calls ‘diminishing returns on the cost effectiveness of metrics.’ That is to say, collecting and reporting some metrics gives access to a larger pool of capital, but doubling the monitoring and reporting does not continue to increase the amount of available capital. For many investors, the presence of an environmental impact report in various funds seems evidence enough of positive impact. The amount of impact generated has not a point of differentiation, not because investors don’t care about it, but because they have not proven that they care about it.

3.5 – Goal to Standardize Environmental Accounting
Despite calls for standardization, there was no clear unified vision among fund managers for the future of environmental accounting of real assets. There was a common view that investors are going to become increasingly interested in the environmental components of their investments. This has been, and likely will continue to be the central driver in the space. According to one fund, foundations in the U.S. are pushing funds’ metrics as they aim to align their investments more with their mission. Multiple funds mentioned that they believe investors will increasingly worry about outside scrutiny around environmental risk and therefore will begin to ask more
sophisticated questions. Other funds recognized the need to move from more qualitative, “story-telling” to more metrics based, quantitative reports.

Other funds mentioned plans to pilot technology applications in the future to collect data in a more streamlined manner such as drones or remote sensors. Recognizing the amount of hours and money it takes to measure, these funds are searching for more efficient mechanisms by which they can collect and analyze the data coming off their assets. These efforts are largely seen within funds that collect environmental metrics to improve asset performance.

The mitigation banks we interviewed did not have material plans to change their metrics. Some saw the potential for change in the monitoring requirements set by the USACE. The context for environmental monitoring that regulation provides – proven and sustained environmental performance – allows investors to largely ignore the impact of their investments. Mitigation funds don’t compete on the basis of their impact, as it is considered so high and is a requisite for operations.

3.5.1 - Role of 3rd Party Advisors

As environmental real assets investing gains momentum as an asset class, investment advisors’ role in environmental accounting and reporting will increase as will the level of environmental sophistication needed. As more HNWIs, endowments and foundations come to advisors for help with verifying environmental impact, advisors will likely have to become even more systematic in their review of funds. There is a growing need for environmental expertise in capital markets. Generally, the advisors we approached come from traditional investing backgrounds as opposed to operations or asset management roles. Into the future however, we see environmental intermediaries providing sought-after advise and fill the gaps of financial advisors.

Environmental intermediary mechanisms could lead to more standardized metrics for different asset types, however what we see already is the use of proprietary rating schemes. Advisors have strong incentives to use their own schemes, just as managers use their own metrics, avoiding direct competition. This gets at the heart of why we don’t yet have metrics standardization. Certain funds would expect to perform better on certain metrics given the nature of their investments. It behooves each fund to measure and report those metrics, which frame it as most environmentally impactful. Until required, funds seem content to provide information that does not allow direct comparison. Meanwhile, advisors compete for business by creating their own proprietary metrics, using them as competitive advantage among investor clients.

3.5.2 - Regulations, Certifications, Industry Leaders

There is no doubt that investing in real assets, whether marketed as impact or conventional, is a competitive field with a diverse set of funds, investors, and advisors. We were surprised to find that funds did not identify, much less agree on, a leader in environmental accounting across the industry. The vast majority of the managers we spoke to could not name one fund
that was at the forefront. Many said they thought their fund was doing well, but couldn’t identify another fund that stood out as setting a standard. The only aberration to this prevailing response was that advisory firms, “such as Sonen [Capital], do the best job.” This respondent went on to say that advisory firms seem to allocate more resources to environmental accounting because they are more investor facing, and often, one degree removed from both the management of the assets and the financial returns. Follow-up research revealed that Sonen Capital does use exclusively IRIS metrics developed by The GIIN with the hope that others follow suit.

This finding underscored the lack of efforts in standardization as well, as funds are not looking to each other for comparison. Again, it could be that while investors would like and benefit from a framework that allows for comparison on environmental performance, funds are not interested or incentivized to all such comparisons.

Nearly all funds had internal and external investor-facing reports, often highlighting roll-up statistics across funds. Depending on requests from investors and standard procedures, this may be quarterly, annual, or as requested. Many, though not all, put out a periodic Impact or Sustainability Report highlighting do-good activities and environmental gains. These largely avoid rigorous quantitative analysis, but rather involve descriptive metrics such as acres under management, number of trees grown, projects completed, pounds of sustainable crop harvested, etc. Despite funds measuring and reporting internally, it seems little of this information is made public, and is even less scrutinized by competing funds.

So why, when we asked what funds in the business does this best, are there no standouts? The investment industry, whether impact or conventional, is a high-stakes game where information is closely guarded and competition is fierce. There are entrenched standards around confidentiality, which permeates throughout the industry and spill into environmental accounting. That is not to say funds do not make information available to investors and the public, they certainly do. However, because of the diversity of types of metrics, certifications, asset types, geographies, and investment strategies it is difficult to achieve points of comparison or for any one fund to stand out.

It may be to the advantage of funds not to have standard metrics and reporting methods. Objectively, we would think this is a goal of the industry, to align their metrics to help drive positive impact, ease interpretation for investors, and be able to compete not just on a financial basis but also on an impact basis. There are risks to this, however. Funds may not be producing the type of impact their investors expect. It may increase competition to the point that managers are sacrificing financial returns to compete on impact, which may drive away large conventional investors. We may also see a survival of the fittest, where the majority of the impact capital goes to the top performers and those who provide less impact are starved for capital. We think funds could be comfortable using disparate metrics and not being directly compared to one another so that they may avoid competing on a truly level playing field.

One manager offered that the impact gap between managers and investors could possibly be filled by advisors and/or certification bodies. Advisors currently play a large roll in directing capital and interpreting impact. However, there is no clear way to compare advisors on environmental performance, as they are still subject to many of the same shortfalls (lack of
standardization and interpretation of metrics) that funds experience. Advisors instead rely on the reputation and brand they have built, to attract clients and build scale. The possibility for a certification body to establish itself and take the role of validating, interpreting, and simplifying data for investors is particularly appealing.

There are, however, obvious drawbacks to certifications. Funds have little incentive to exceed criteria or measure anything not recognized by the certification because there is little ability to differentiate. Certifications are criticized for ‘dumbing down’ the environmental metrics, inherently losing much of the information gathered; and both investors and managers would bear the cost of certification (though this might save on in-house measuring). If done correctly we believe certifications can accurately inform investors without requiring high levels of sophistication on environmental metrics, and without losing the useful information gathered. Currently the certifications that do exist, mostly in timber, are threshold certifications, not scales. That is to say if a fund meets or exceeds certain criteria it can be labeled as such, instead of using a certification scale of say, 1 through 5, based on how many criteria are met. Certifications and certifying bodies may have the opportunity to communicate impacts in simpler terms. This may bridge a large gap between funds’ abilities to measure and satisfactorily report, and investors’ ability (time and expertise) to interpret impacts.

4.0 - THE PATH FORWARD FOR METRICS

As with any emerging asset type, the managers and investors who continue to scan the horizon for future trends and changes are those who set the bar for performance and impact. Based on the trends that emerged throughout the fund surveys, we've attempted to forecast key shifts in metrics among both environmental real assets and the key investors.

Many funds and managers identified the need for better metrics. Managers described three specific improvements.

(1) Because of the range of asset types, geographies, and ESG considerations there was a call for standardized metrics and their subsequent adoption. GIIN, in collaboration with many managers, developed IRIS metrics, which have been referenced throughout this paper. These were not full adopted, and were often amended by funds to better fit their goals. IRIS metrics did not provide a means for competing on environmental impact (and perhaps were not designed to). We have heard from managers that there was not a way to compare environmental returns across funds. Without the ability to compete on quantifiable environmental return, funds competed on the presence of impact (not the amount), and how that impact is reported. There was little incentive to strive for greater impact.

(2) Where we can saw competition based on metrics was within mitigation banking. Our a priori hypothesis was that bankers would call for less regulation, though in one case the opposite proved true. Not only did they see better science leading to more stringent regulation, but they welcomed it. As mentioned, some mitigation bankers saw high regulatory thresholds as barriers to entry, but also as a validation of the environmental good they were doing.
(3) The third improvement managers want was improvement in the quality of metrics for the sake of communication. Undoubtedly this was closely related to the previous two. Managers were required to report, therefore they collected metrics, however metrics do not seem to communicate impact very effectively. Imagine metrics as being designed to either measure impact in a quantifiable manner, or communicate impact in a clear and coherent manner. In such a young and immature industry it was clear that metrics that do both well do not exist. More energy should be devoted to improving how impact is measured and communicated. Investors clearly called for the later, and managers have reported that investors’ wishes drove their environmental accounting efforts, so it would seem to follow that more effort be directed to designing metrics that can be communicated and understood, than designing metrics that can accurately and quantifiably measure environmental impact.

4.1 - The Future of Metrics by Asset Type

4.1.1 - Timber
Because timber and timber investments are so well established we expect to see minimal change within the sector. The use of certifications will continue, although it feels as though the sector is outgrowing the current schemes. As both SFI and FSC are nearly ubiquitous, there is little ability to differentiate among certified assets. Some funds are using other metrics to enhance their environmental accounting, but we do not see this as taking hold throughout. We believe that FSC and SFI have the opportunity to scale their certifications, and possibly use a ranking or points-based system, as they are both well established in the industry.

4.1.2 - Agriculture
Within agriculture investing, it is our prediction that there will continue to be disparate environmental metrics efforts with some funds creating their own internal systems or trying out various external certifications. This will continue until there is an agreed upon, unified third-party certification or strong consensus among investors as to what they are looking for in agriculture investments. At present, USDA Organic is the only unified certification. We predict that it will continue to be popular because of the widespread recognition and acceptance within the marketplace and the associated premium growers receive. However, organic is not a suitable proxy for sustainable, and it is not viable for every crop type, region, or scale. A future coherent set of metrics for environmental impact among agriculture investing would have to aggregate across crop type and region in order to capture the nuances of various ecosystems in which farmland exists, or be specific to each.

Perhaps it is to agriculture funds’ advantage to not have a set of unified environmental metrics. Funds may not want to compete on environmental outcomes. Marketing to investors is a more straightforward way to compete to access capital, rather than on the environmental performance on a unified metric. Might there be incentives at play for agriculture investing to continue to use the disparate metrics rather than come to consensus on united metric system as this asset type continues to gain momentum? Funds are currently free to select the metrics that best frame the mission of the fund and are advantageous to their business model. The risk
in agreeing upon a standardized metric is that some funds will emerge as winners, and the rest will be unable to attract capital in the future. It is therefore our prediction that it will not be the agriculture funds themselves that will push for standardized metrics. Instead it will likely be investors or advisors who begin to adopt a standardized set of metrics when engaging in due diligence and evaluating ongoing performance of agriculture funds.

4.1.3 - Water
Given that water investing is still in nascent form and see very little investment capital, we believe that it will be on the order of a decade or more before a united metrics scheme for water investing is created. As of now the one metric that the small group of water investment funds rely on is flow or quantity. Future metrics schemes could be expanded to include water quality (i.e. nutrient load, temperature, dissolved oxygen etc.) as well as species counts. However, water markets are still forming, as are policies around inter-basin transfers and water quality credits. Until a regulatory foundation, or clear returns for water markets are set, there will likely be no unifying environmental metric for water investors. Much investor education is needed before they or advisors begin to push for coherent metrics.

4.1.4 - Mitigation Banking
Mitigation banking is without a doubt a growing industry, with the ability to expand into other off-set markets. Endangered species habitat banks, and water quality trading, and the possibility of opening up select public lands to mitigation, provide opportunities for future growth. With that growth, and the increasing ability of regulating bodies to structure off-set markets with good science and management, we expect to see increasing regulation and oversight. As is currently the case, we do not expect the use of metrics beyond what is required. Mitigation will continue to prove itself as both financially and environmentally positive, attracting more capital from both impact and conventional investors.

4.1.5 - Fisheries
Fisheries is also a very young asset for private investment. The model is still being proven but any form it takes will likely need strong regulation and NGO cooperation to ensure that a market is created with clear rules, enforcement, and the support of parties without vested interests. Likely, this means that fisheries use metrics are collected out of necessity to ensure that the laws that allow a credit (in the case of fisheries the catch quota share) to be released or traded. When this market does mature it will likely take advantage of certifications already present within industry. The Nature Conservancy integrates aspects of the Marine Stewardship Council’s (MSC) into their active monitoring and management, expect any future market to similarly build off of the metrics work of previous efforts and certifications as opposed to reinventing the wheel. Despite the promise, it still remains unclear to what degree governments and regulatory bodies will engage on this issue especially since fisheries occur in various ocean locations sometimes without a clear governing body.

4.1.6 - Institutional Investors
Institutional investors are stuck navigating between complex market forces and the desire to diversify. It is clear that institutions with a mission will continue to face pressure from their
stakeholders to invest in assets that affirms their mission. Foundations and endowments are clear examples of where people now actively protest certain funds investing in carbon intensive assets, environmental real assets will continue to be a place where mission driven institutions can balance their mission with their fiduciary duty. Even pensions will face increasing mandates around environmental impacts as the public grows more aware of the ability the pensions have to drive change through their investing choices.

As these institutions remain in the space, fund managers are already seeing that the level of impact and complexity of environmental metrics they are requesting is increasing. This demonstrates a trend of increasing sophistication among institutions that stay in this space for the long haul.

Finally, institutions at large will continue to invest impact in certain environmental assets because they see it as a climate hedge, an inflation hedge, and with little correlation to broader financial markets. Depending on the financial market, institutions’ willingness to take longer investment horizons will be weighed as real assets is and will always be a relatively illiquid investment.

4.1.7 - HNWI

High Net Worth Individuals are difficult to generalize about. Their impact objectives will likely continue to be highly unique and specific to their impact goals and the legacy they want their capital to create. In our interviews with fund managers, we found that many HNWI’s request specific impact metrics or stories that correlate with their desired outcome. Some desire to revolutionize an industry, some desire to invest in assets while creating jobs, and some want to tackle the issue of food deserts.

One notable trend though was with investment/wealth advisors that specialize in impact. Many advisors market proprietary ESG rating systems to separate themselves from the competition. This trend was noted by fund managers as troublesome. Many investment advisors working on behalf of their clients have complex ESG ratings, frameworks, and metrics they request from funds. These systems are proprietary to the advisor as a value added service to their client, and may only serve to create noise in the market. We now have both funds and advisors selling their impact, impact metrics, and ability to identify impact, but we are still no closer to creating agreed upon systems of measurement and communication that will allow advisors and funds to be able to market themselves uniformly.

Finally, we worry that some HNWI’s impact focus in the space is perpetuating the view that impact comes at a sacrifice to financial returns, as some funds deploy capital solely based on their investors desire for impact. This may cause decreased returns and lead to an alienation of impact funds and investors from conventional investors.
5.0 - CONCLUSION

As the environmental real assets investment sector continues to grow, environmental measurement and reporting must advance. Scrutiny among the public and investors alike must continue. Those funds well positioned to demonstrate their environmental performance with well articulated and clear data will succeed. The results of our fund manager survey indicated three main takeaways

- Despite early efforts to standardize, disparate metrics within and between asset types led to funds competing on environmental accounting and reporting efforts, instead of environmental performance;
- Environmental accounting was motivated by various forces that are either internal or external, however self identification as impact or conventional did not correspond to environmental accounting efforts;
- Investors influenced what funds measure but are increasingly turning to 3rd party advisors to interpret impact. However, many 3rd party investment advisors did not have the environmental expertise to determine highest environmentally performing funds and direct capital towards them;

From these takeaways it is clear to us that standardization both in units and language of environmental accounting is beneficial going forward. Though this has been attempted already by the GIIN, we are not seeing the widespread adoption among funds. For standardization to occur, we believe that funds must engage the environmental community more, but in turn the environmental community must also look for opportunities to bridge the gap between the investment and science disciplines.

Though this project has shed some light onto the measurement and reporting practices of private environmental real assets funds, many questions remain. First is whether the disparate efforts of creating individual metrics schemes that funds are currently engaging in will scale. Is it appropriate for these schemes to scale given the diversity of land uses, geographies, objectives and ecosystems these funds own assets in? Next, if funds cannot explicitly link measuring environmental outcomes with financial returns, will they abandon efforts? As we have heard, some funds worry that measuring is just an academic exercise. If those funds cannot drive financial performance through environmental performance, perhaps measurement efforts will wane. Finally, it is increasingly accepted that there may not have to be a tradeoff between impact and returns in the environmental real assets arena. However, as investor interest in this investment area grows there may be a point at which environmental impact inherently will suffer. The answer can only be determined if robust metrics schemes are in place for the future.
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APPENDIX

Appendix 1. Six Principals of UN PRI

“Six Principles of UN PRI: 1. We will incorporate ESG issues into investment analysis and decision-making processes, 2. We will be active owners and incorporate ESG issues into our ownership policies and practices, 3. We will seek appropriate disclosure on ESG issues by the entities in which we invest, 4. We will promote acceptance and implementation of the Principles within the investment industry, 5. We will work together to enhance our effectiveness in implementing the Principles, 6. We will each report on our activities and progress towards implementing the Principles.” For further reading on UN PRI, please see: [http://www.unpri.org/](http://www.unpri.org/)

Appendix 2. Investment screening framework
## Appendix 3. Top 10 Largest TIMOs by region of investment

<table>
<thead>
<tr>
<th>TIMO</th>
<th>North America</th>
<th>Latin America</th>
<th>Oceania</th>
<th>Africa</th>
<th>Asia</th>
<th>Europe</th>
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<tbody>
<tr>
<td>Hancock Timber</td>
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<td>Campbell Global</td>
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<td>Breakfield</td>
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<td>Global Forest Partners</td>
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<td>BTG Pictet</td>
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Appendix 4. Interview Primer and IRB Disclosure Statement

*Interview Primer:*
Environmental Real Asset Investing
Nicholas School of the Environment
Masters Project, May 2016

This primer, along with our IRB disclosure and methods insight, serves as a brief introduction to our research goals and your participation. Our research explores financial investments made in environmental real assets, such as agriculture, timber, water quality and quantity, mitigation services, fisheries, and rangeland. We are focusing on environmental metrics, their design, recordation, and reporting.

Our survey is approximately 10 questions that are designed to be conversational and reveal how your firm and/or fund measures environmental metrics, you motivations for recording or not recording, how you report those metrics and to whom, and lastly, how your investors perceive environmental metrics.

Again, our overarching goal is to explore the range of recording and reporting methods for environmental metrics in real asset investing. We very much appreciate your interest and participation, and hope that our findings can help support and strengthen this market.

For questions or further clarification feel free to reach out to any member of the team.

*IRB Disclosure and Methods Insights:*

The data we are collecting is not subjective, or opinion based. We are using this interview to gather data about the firm, specific funds, accounting measures and metrics. Anything you say should be in reference to objective fact and on behalf of your firm, and should not be based on your own opinion. In light of this, our methods and the data we are collecting are exempt from Institutional Review Board standards.

The Institutional Review Board (IRB) is designed to protect the rights and welfare of human research subjects, and assure regulatory and institutional compliance. Our methods and research DOES NOT collect data on human subjects.

IRB training and protocol is necessary when the data collected is directly tied to human subjects. This is most commonly opinion data or medical data.

*Example: Collecting data on people’s satisfaction of a new service provider.*

*Example: Clinical studies on the effects a new drug has on Alzheimer patients.*

Methods Insights and Assurances:

*Our research will be presented as a Masters Project (MP) for the Nicholas School of the Environment in Spring 2016. All MPs are to be of publishable quality and made publically available through the Nicholas School.*
We grant that there is sensitive data and proprietary information of each firm, fund, manager, investor, and advisor. It is our foremost goal to keep such information private and to practice discretion throughout our research and product delivery. Given this, our raw data will remain private and protected. All data and analyses will be aggregated and anonymized. It will not be possible to trace back any financial or environmental performances, or other specifics pertaining to firm, funds, managers, investors, or advisors.

It is our objective to gain insights into the environmental real asset investment industry, not the firms themselves. All insights will be provided to participating firms, should they request it.

Thank you for participating and contributing to our efforts. All members of the team are available to answer any questions.

Regards,

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Appendix 5. Fund Survey

**Fund Manager Survey**

**General Firm**

Fund name:
Fund Target Resource:
Fund Details/Thesis/Status/Investors/Target Return:
Fund Size:
Length of Fund Life:

**Questions how do you identify investments?**

1. What reasons does your firm have to measure the environmental impacts of this fund(s)? What reasons does your firm have not to measure the environmental impacts of this fund(s)?

2. *Marketing:* How is this fund marketed to investors? Are there any risks to this?

3. What are your metrics? (financial, social environmental) Please explain.

4. What standards, processes, and certifications does the underlying assets of your fund employ? Do you use any external resources, organizations, or tools to assist in tracking progress or performance of these assets?

5. Do you have a plan for changing your environmental impact metrics over the next 10 years?

6. Is there a fund or firm that is measuring this really well. (Leading in reporting in the environmental impact space?)

7. How interested are investors in knowing the environmental impacts of their investment? How does this change or does this change over the life of investment? (qualitative/quantitative?)

8. Do you have a sense for whether institutional investors: pensions, foundations, etc.... care more about this? Kevin to give us the break down

9. How are ecological impacts communicated to investors currently?

10. Do you screen your funds environmental impact in the deal pipeline?

**Other Questions:**

*Is there anything we should have asked you (leave 5 min)*

*Are there any ecological reporting requirements now and do you see any coming in the future? Are these requirements primarily driven internally, industry wide, external (NGOs/policy makers), or from investors?*
Appendix 6. Comparison in environmental metrics between two agriculture funds with similar focal crops and geographies

<table>
<thead>
<tr>
<th>Ag Fund #1</th>
<th>Ag Fund #2</th>
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<tbody>
<tr>
<td>- Biodiversity metrics within the farm and in riparian areas</td>
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<tr>
<td>- Energy and water efficiency metrics</td>
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<tr>
<td>- Labor metrics on farm and in supply chain</td>
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<tr>
<td>- Piloting the Stewardship Index for Specialty Crops (SISC) scheme</td>
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<tr>
<td>- Soil quality and nutrient loads</td>
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<td>- Surface and groundwater risk</td>
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<tr>
<td>- Carbon emissions/sequestration</td>
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<tr>
<td>- Piloting the Fieldprint Calculator scheme</td>
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</table>
Appendix 7. Additional thoughts from individual fund managers on why they measure environmental outcomes that were not shared by more than one manager.

Risk/Return Profiles

A common issue that managers in newly formed environmental markets (i.e. fisheries and water rights) rose regarded varying approaches to risk. Investments in such real asset types are subject to a large number of risks, which get roll up as financial variability (financial risk). In theory, the financial risk associated with a given investment factors in all other types of risks, including environmental risk. The inverse is, in theory, also true: that environmental gains realized through rigorous monitoring result in financial gains. Of course, neither of these is entirely accurate. Investments in asset types such as mitigation banks, water property rights, and fisheries are relatively new or taking new forms. Fisheries, for example, are notoriously difficult to monitor. Mitigation banking is subject to regulation, which can (and does) change with no regard for the existing marketplace. The underlying asset of water rights is experiencing increased environmental variability, and regulation, which can fundamentally alter the value of the asset. With the number of unknowns and environmental variability inherent in these asset types, it can be very hard to accurately quantify the risk. When risk is unknown, investors always assume the highest risk and lowest value.
Appendix 8: Breakdown of Deal Screening Process for 1 Fund:

*Exclusion:* Investments the fund prohibits. Example: This fund has made a decision not to invest in concentrated animal feeding operations CAFOs. Any potential investment in this area would be passed up by this fund.

*Neutral:* An investment that does neither harm or good to the mission. Example: A traditionally run conventional farm. The fund may invest in this strictly for its risk-return potential but it wouldn’t proactively seek out or pursue this investment.

*Light Green:* An investment with moderate impact potential and moderate mission alignment with the fund’s mission. The fund will proactively seek this investment due to this qualitative rating provided that it meets the funds target risk return profile. Example: At least 1 of the following abilities, full or partially organic production, ability to create new/better jobs in the area, or the ability to provide healthy/local food in an area identified as a “food dessert”.

*Dark Green:* An investment that has significant impact and is fully mission aligned with the fund. The fund may even take a small compromise in the risk return in proactively investing here. Example: A farm that is a conversion from conventional to organic, creates a significant number of new jobs, and increase access to healthy food. This investment would align impact on numerous social and environmental scales for the fund.
Appendix 9. Key quotations from fund managers on investors’ interest in environmental outcomes

“German and Scandinavian clients in particular are very proactive about asking for environmental information. One Dutch investor required a 14 page ESG questionnaire during the due diligence phase.”
--Timber Fund manager

“HNWIs like the impact story to brag to their friends. They’re willing to compromise on return but are not willing to take on more risk.”
--Mitigation Bank Fund manager

“Foundations are increasingly trying to match their investments with the mission of their foundation.”
--Ag Fund manager
Appendix 10. Spectrum of Investors' motivations towards environmental concerns based on expected outcomes and willingness to compromise on financial returns