Ecosystem Markets: Watersheds

These EnviroAtlas Ecosystem Marketplace map layers display polygons representing watershed services markets and projects in the United States as of 2014. Project polygons represent the hydrologic unit(s) where projects are located mapped at the 8-digit HUC level. Market polygons represent states and regions that share common market infrastructure and rules or a larger program encompassing many smaller projects. Points represent the centroid location of hydrological units at the 8- digit HUC level.

Why are markets for watershed services important?

Healthy ecosystems provide us with a wide range of services—including reliable clean water, climate regulation, and productive soils—and they underpin many of our basic needs, economic processes, and cultural or spiritual values. However, except for primary goods like food, fuel, and fiber, most of these ecosystem services do not have widely-accepted, tangible market values.[1] As a result, ecosystems continue to decline because protection of ecosystem services is rarely considered in economic decisions. The Millennium Ecosystem Assessment found that >60% of ecosystem services are degraded faster than they can regenerate.[2]

One approach to safeguarding ecosystem services is through incentive mechanisms for conservation, including markets. With ecosystem services markets, companies, communities, and other beneficiaries pay landowners and managers to protect, restore, or mitigate for impacts to ecosystems.[3] Ecosystem market mechanisms range from simple contracts between a buyer and seller to sophisticated markets for environmental credits representing delivery of an ecosystem service. All of these mechanisms share the common practice that parties will restore or maintain the delivery of an ecosystem service or group of services in exchange for financial compensation.

Typically, markets focus on a single ecosystem service or asset. The most well-established markets in the United States represent forest carbon sequestration, imperiled species and habitats conservation, wetlands and streams conservation, and watershed services. Markets may be established by or driven by a specific policy or regulation. They can range in scale from a local initiative to national or international efforts. A project is a site, or suite of sites, where restoration, enhancement, establishment, or other resource conservation


Photo: Northeast stream, R. Tiner, USFWS

actions are implemented for the purposes of marketing one or more ecosystem service assets to buyers. A market may encompass many distinct projects.

Globally, markets for watershed services compose the largest category of payments for ecosystem services in terms of annual transaction values. Markets for watershed services may include credits representing annual load reduction of a particular pollutant, acre-feet of instream flow augmentation, or gallons of groundwater recharge. The best example of marketed watershed services in the U.S. is the domestic water supply source for New York City located in the Catskill Mountains. In the early 1990s, New York City chose to help finance the management of the water purification services of a large forested watershed rather than invest $6–8 billion in a new water treatment plant.[4] Though New York City is the most prominent example, Ecosystem Marketplace documents 98 other examples of watershed investment nationwide as of 2013.[5] In practice, a range of mechanisms for the exchange of watershed services assets currently exist, some more 'market-like' than others. Please see Ecosystem Marketplace's primer on ecosystem markets and finance for more information on common transaction mechanisms.[3]

How can I use this information?

This map is one of seven Marketplace maps displaying information on ecosystem market size, scope, and activity in the United States. Users can examine these map layers to understand the geographic distribution of ecosystem markets, identify potential market opportunities, and explore markets and projects by asset type, goals, reason for

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implementation, exchange mechanism, and intervention. These maps can be combined with other EnviroAtlas map layers to provide a context for market activity and analyze the market's contribution to conservation objectives. They may be compared with other Marketplace map layers, such as Ecosystem Markets: Point Data and Enabling Policies for Ecosystem Markets, for additional detail on market scope and the role of policy and regulation.

How were the data for this map created?

These data were generated by Forest Trends' Ecosystem Marketplace research on water markets conducted during 2014. Data were collected via Ecosystem Marketplace surveys and desk research on market coverage areas and project primary impact areas associated with watershed investment markets and projects. These areas reflect the state(s), region(s), or watershed(s) in which markets and projects operate to protect hydrological ecosystem services. HUC8 polygons were used as the standard geographic unit for depicting markets and projects identified as operational at the watershed scale; HUC8 polygons were drawn based on the 2014 NRCS Watershed Boundary Dataset (WBD). For water markets and projects operating at the national, state, county, or federal lands level, polygons were drawn from 2010 U.S. Census or 2010 Public Land Survey System boundary layers. Tabular attribute data compiled by Ecosystem Marketplace were standardized, imported into an ArcGIS table, and joined with corresponding spatial records.

What are the limitations of these data?

EnviroAtlas uses the best data available, but there are still limitations associated with the data. These data originate from the U.S. Army Corps of Engineers Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS) database and on responses to Ecosystem Marketplace's annual 'State of the Market' survey of project developers, market and program administrators, brokers, retailers, and other market actors. Wherever possible, responses are checked against credit registries and other third-party sources. However, EnviroAtlas and Ecosystem Marketplace provide the geographic data "as is" and make no guarantee or warranty concerning the accuracy of information contained in the geographic data. Users of these data are strongly advised not to use the content of Marketplace data in isolation but to take that information together with other market information to formulate one's own views, interpretations, and opinions. The user is strongly advised to seek appropriate legal and professional advice before entering into commercial transactions. We recommend that the user become familiarized with the terminology and concepts used in these data.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded.

Where can I get more information?

Further information is available in Ecosystem Marketplace's primer on ecosystem markets and finance.[4] Additional information on watershed services markets in the United States can be found at Forest Trends' Ecosystem Marketplace. Ecosystem Marketplace also maintains an inventory of programs, based on the same dataset used to develop these EnviroAtlas map layers but providing additional details, at Watershed Connect. A selection of resources related to ecosystem valuation, markets, and watershed services is listed below. For additional information on how the data were created, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the EnviroAtlas Team.

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Selected Publications

1. King, D.M., and M. Mazzotta. 2000. Ecosystem valuation. Accessed March 2016.

2. Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: Synthesis*. Island Press, Washington, DC.

3. Forest Trends' Ecosystem Marketplace. Atlas of ecosystem markets in the United States. Accessed October 2016.

4. Saltzman, J. 2005. Creating markets for ecosystem services: Notes from the field. *New York University Law Review* 80(6): 101–184.

5. Forest Trends' Ecosystem Marketplace. 2014. Gaining depth: State of watershed investment 2014. Forest Trends, Washington, D.C.

Forest Trends' Ecosystem Marketplace. 2015. Ecosystem markets and finance: A global primer. Accessed March 2016.