



# Theme Strategic Plan for Biodiversity and Ecosystems Theme

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Lead Agency: U.S. Geological Survey

**Federal Geographic Data Committee (FGDC)**

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## Theme Strategic Plan for *Biodiversity and Ecosystems Theme*

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### Background and Summary

The Biodiversity and Ecosystems Theme (known until recently as the Biota Theme) encompasses datasets that pertain to or describe the dynamic processes, interactions, distributions, and relationships between and among organisms and their environments. The U.S. Geological Survey (USGS) is the lead federal agency for this National Geospatial Data Asset (NGDA) Theme. As such, the USGS's primary role is to coordinate national coverage and stewardship for this Theme, using a portfolio management approach. The Biodiversity and Ecosystems Theme Lead provides leadership and coordination at the NGDA Theme level and reports to the Federal Geographic Data Committee (FGDC) Steering Committee on a regular basis.

The Strategic Plan for the Biodiversity and Ecosystems Theme follows Objective 2B of the National Geospatial Data Asset Management Plan that requires all NGDA Themes to prepare a strategic plan for the period FY2017-FY2022.

The goals are listed below:

Goal 1: Ensure the Effective Development and Maintenance of the Biodiversity and Ecosystems Theme Datasets

Goal 2: Facilitate the Sharing and Distribution of Biodiversity and Ecosystems Theme Datasets

Goal 3: Engage the leadership and stakeholders of the Biodiversity and Ecosystems Theme Geospatial Community

The purpose of the following Strategic Plan is to present the activities associated with the Biodiversity and Ecosystems Theme in addition to noting opportunities and challenges in managing the Theme.

### Strategic Plan for the Biodiversity and Ecosystems Theme

NGDA Datasets in the *Biodiversity and Ecosystems Theme*:

Biodiversity and Ecosystems NGDA Dataset Title	NGDA Dataset Lead Agency
Bailey's Ecoregions And Subregions Of The United States, Puerto Rico, And The U.S. Virgin Islands - Direct Download	USDA-USFS
Environmental Sensitivity Index (ESI) Data Viewer and REST Services for Atlases	DOC-NOAA
FWS Critical Habitat for Threatened and Endangered Species Dataset	DOI-FWS
Omernik's Level III Ecoregions Of The Conterminous United States	USEPA
Terrestrial Ecosystems of the Conterminous United States	DOI-USGS
U.S. Geological Survey Gap Analysis Program Species Distribution Models	DOI-USGS
U.S. Geological Survey Gap Analysis Program Species Ranges	DOI-USGS

(Master list: [https://www.fgdc.gov/ngda-reports/NGDA\\_Datasets.html](https://www.fgdc.gov/ngda-reports/NGDA_Datasets.html))

It is important to note that not all of the NGDA Datasets above are managed by the USGS. Management of the Biodiversity and Ecosystems Theme is currently an interagency effort across four agencies.

## Goal 1

### Goal 1: Ensure the Effective Development, Maintenance, and Support of the Biodiversity and Ecosystems Theme Datasets

The Theme Lead agency and Dataset Managers are committed to the development, maintenance, and distribution of authoritative biodiversity and ecosystems data. The Dataset Managers across the Theme work together with the Theme Lead to ensure that these datasets meet NGDA requirements.

**Objective 1.1.** Maintain and distribute the authoritative dataset for Bailey's Ecoregions and Subregions.

**Anticipated Outcomes.** The Bailey's ecoregions spatial database supports Robert Bailey's book "Ecoregions." The ecoregions classification is used by a number of organizations. The dataset is available for a variety of applications such as biodiversity conservation planning, resource management, and research.

Action 1.1.1. The Bailey's Ecoregions data publication (<http://dx.doi.org/10.2737/RDS-2016-0003>) continues to be available for download via the Forest Service Research Data Archive.

Action 1.1.2. Ensure that the dataset format is updated as needed to remain compatible with commonly used GIS software.

Action 1.1.3. Deposit an updated metadata record in Data.gov and ensure that the full metadata are also available through GeoPlatform.gov. Remove outdated metadata records to avoid confusion.

**Objective 1.2.** Develop, maintain, and distribute Environmental Sensitivity Index (ESI) maps and datasets for shorelines, biological resources, and human-use resources for the coastal U.S.

**Anticipated Outcomes.** Datasets that form a concise summary of coastal resources that could be at risk in the event of an oil spill will be available for a variety of applications.

The ESI data characterize the marine and coastal environments and wildlife by their sensitivity to spilled oil, and include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. The ESI data are intended to provide baseline environmental data for oil spill planning and response. The Clean Water Act, with amendments by the Oil Pollution Act of 1990, requires response plans for immediate and effective protection of sensitive resources.

This information is used directly in oil spill response, as well as for advance planning to create cleanup strategies before an accident occurs. Both of which reduce the harmful consequences of oil spills and cleanup. Organizations can use the synthesized data to create efficient and effective cleanup strategies. The ESI data may also be appropriate for many other coastal management efforts, although the original intent should be kept in mind.

Action 1.2.1. Publish ESI GIS data for South Carolina; Georgia; New York/New Jersey metropolitan area, Hudson River, and South Long Island; and Long Island Sound in fiscal year (FY) 2016.

Action 1.2.2. Publish ESI PDFs and maps for South Carolina; New York/New Jersey metropolitan area, Hudson River, and South Long Island; and Long Island Sound in FY 2016.

Action 1.2.3. Publish ESI GIS data for Maine/New Hampshire, Massachusetts/Rhode Island, Chesapeake Bay (Virginia/Maryland), North Carolina, and West Peninsular Florida in FY 2017.

Action 1.2.4. Publish PDFs and maps for Maine/New Hampshire, Massachusetts/Rhode Island, Chesapeake Bay (Virginia/Maryland), North Carolina, West Peninsular Florida in FY 2017.

**Objective 1.3.** Develop, maintain, and distribute the authoritative dataset for Critical Habitat for Threatened and Endangered Species.

**Anticipated Outcomes.** Critical Habitat datasets readily available within the DOI, federal government and ultimately to the public. These datasets can be used for conservation efforts, planning purposes, and scientific analysis. These datasets should be easily accessible in multiple formats (web services, mappers, shapefiles) so that additional value can be derived by leveraging the underlying data through application of additional analytical processes. As new critical habitat data are released, the updated data should be incorporated into the overall dataset within days. This process is dependent on coordination with the local field offices that create the critical habitat datasets for individual species.

Action 1.3.1. Finalize public web services and web map delivery of Critical Habitat data in 2016.

Action 1.3.2. Start automating critical habitat data loading process by converting individual manual steps in the data loading process into scripted and automatically repeatable data loading steps in 2016

Action 1.3.3. Create a reproduce-able report indicating which critical habitat data have not been integrated into the overall critical habitat dataset in 2016.

**Objective 1.4.** Develop, maintain, and distribute the authoritative dataset for Omernik's Level III Ecoregions.

**Anticipated Outcomes.** Omernik's Level III Ecoregions dataset, documented in a 2014 article\* by Omernik and Griffith in Environmental Management, along with additional supporting information, will be readily available and accessible for a variety of environmental applications.

\*The article (Omernik, J.M. and G.E. Griffith. 2014. Ecoregions of the conterminous United States: evolution of a hierarchical spatial framework. Environmental Management 54(6):1249-1266) is located at <http://link.springer.com/article/10.1007%2Fs00267-014-0364-1>.

Action 1.4.1. Omernik's Level III Ecoregions dataset, along with supporting information, is available for download via the EPA's Ecoregions website at <https://www.epa.gov/eco-research/ecoregions>.

Action 1.4.2. Maps, descriptions, and tables of characteristics of ecoregions at all four hierarchical levels (not only Level III) are available at the EPA's Ecoregions website in 1.4.1 above. This includes two coarser hierarchical levels (I and II) and one more detailed hierarchical level (IV).

Action 1.4.3. Evaluate additional hierarchical levels for inclusion either as separate NGDA's in the Biodiversity and Ecosystems Theme or as part of an expanded dataset including all hierarchical levels. If the dataset is expanded to include all levels, consider renaming it to either, "The EPA/Omernik Hierarchical Framework of Ecoregions of the United States" or "Omernik's Hierarchical Framework of Ecoregions of the United States" to more accurately describe its contents.

**Objective 1.5.** Develop, maintain, and distribute the authoritative Terrestrial Ecosystems datasets for the nation.

**Anticipated Outcomes.** Authoritative geospatial data layers representing potential (pre-disturbance) and actual (current) national terrestrial ecosystems will be available for a variety of applications including climate change impact assessments, economic and social valuation assessments, biodiversity conservation planning, research, and resource management.

Action 1.5.1. Change the name of the existing NGDA Dataset Terrestrial Ecosystems of the Conterminous United States to USGS National Potential Terrestrial Ecosystems.

Action 1.5.2. Engage the national terrestrial ecosystems community of practice to compare the newly renamed USGS National Potential Terrestrial Ecosystems to the LANDFIRE Biophysical Settings (BPS) resource and decide whether both of these resources, or a synthesis thereof, should be included as NGDAs for national potential ecosystems. If the decision is to nominate a synthesis product, commence a process for conducting a synthesis and evaluating the synthesis product.

Action 1.5.3. Coordinate with, and support as appropriate, the USGS National Gap Analysis Program (GAP) 2016 release of the GAP/LANDFIRE National Terrestrial Ecosystems 2011 resource, currently referred to as the USGS GAP Land Cover v.3.0.

**Objective 1.6.** Develop, maintain, and distribute authoritative U.S. Geological Survey, Gap Analysis Program (GAP) species datasets for distribution and range.

**Anticipated Outcomes.** Species datasets that are used throughout the DOI and across the federal government that meet the requirements of its stakeholders, reduce duplication of effort, and encourage greater stakeholder involvement. These datasets would be available for a variety of applications such as biodiversity conservation planning, resource management, and research. In deriving the species distributions, the National Elevation Dataset, National Hydrologic Dataset, and the National Land Cover Database are all important components used in the data development. Required coordination with those datasets is limited to being aware of the recent innovations and status of those datasets.

Action 1.6.1. Finalize the publication of the GAP species ranges in 2016.

Action 1.6.2. Finalize the publication of the GAP species distribution models in 2016.

Action 1.6.3. Develop the workflow and update the GAP species distribution models based on the GAP/LANDFIRE National Terrestrial Ecosystems 2011 map in 2017. (Note: the GAP/LANDFIRE National Terrestrial Ecosystems map that will be published in 2016 is based on 2011 conditions/imagery.)

Action 1.6.4. Develop a workflow for biennial updates of the GAP species ranges in 2017.

Action 1.6.5. Update the GAP species distribution dataset based on the GAP/LANDFIRE National Terrestrial Ecosystems 2016 dataset that will be released in 2018.

**Objective 1.7.** Complete annual Lifecycle Maturity Assessments (LMAs) for all Biodiversity and Ecosystems datasets.

**Anticipated Outcomes.** In 2015, Dataset Managers completed LMAs that established an initial baseline maturity assessment of the datasets in the Biodiversity and Ecosystems Theme. The Theme Summary Report generated from the assessments provides an overview of the status, overall maturity, and other characteristics for the NGDA Datasets for the Theme. Dataset Managers will update these and evaluate each new NGDA Dataset added to the Theme using the same methodologies to determine data maturity each year.

Action 1.7.1. Update maturity assessments yearly on existing datasets.

Action 1.7.2. Perform initial baseline assessments on any new datasets.

**Objective 1.8.** Identify additional datasets for inclusion in the Biodiversity and Ecosystems Theme, and evaluate against NGDA criteria for inclusion.

**Anticipated Outcomes.** A more comprehensive collection of datasets for use by the Biodiversity and Ecosystems stakeholder community.

Action 1.8.1. Evaluate USGS's 2016 release of the GAP/LANDFIRE National Terrestrial Ecosystems 2011 dataset for inclusion in the Theme.

Action 1.8.2. In 2018, when the LANDFIRE remapping effort is complete, that data will replace and supersede the GAP/LANDFIRE National Terrestrial Ecosystems 2011 resource identified in Actions 1.5.3 and 1.8.1 above as the NGDA for national, actual, terrestrial ecosystems, and will then be called the GAP/LANDFIRE National Terrestrial Ecosystems 2016 dataset.

Action 1.8.3. Identify and evaluate other datasets for inclusion in the Theme as appropriate.

## Goal 2

### Goal 2: Facilitate the Sharing and Distribution of Biodiversity and Ecosystems Theme Datasets

The Theme Lead agency and Dataset Managers are committed to improving the discoverability and interoperability of Biodiversity and Ecosystems datasets for successful use and reuse.

**Objective 2.1.** Leverage the Geospatial Platform website (GeoPlatform.gov).

**Anticipated Outcomes.** The Geospatial Platform website is a critical resource for decision makers and the public to access and use NGDA Datasets within the Biodiversity and Ecosystems Theme. Leveraging GeoPlatform.gov will lead to efficient and effective use of shared technology and infrastructure, and will support better information sharing.

Action 2.1.1. Leverage the shared infrastructure and technologies provided by GeoPlatform.gov to improve access and discoverability of Biodiversity and Ecosystems NGDA Datasets. (Some specific actions are referred to under Objective 2.2 below.)

Action 2.1.2. Develop and maintain the Biodiversity and Ecosystems community pages on GeoPlatform.gov.

**Objective 2.2.** Publish Theme NGDA metadata on Data.gov and on GeoPlatform.gov to facilitate discovery and accessibility of Theme datasets.

**Anticipated Outcomes.** Easily search for and identify Biodiversity and Ecosystems Theme datasets and improve accessibility for a wider audience of users through cataloguing systems such as Data.gov and GeoPlatform.gov.

Action 2.2.1. Create or maintain geospatial metadata in compliance with International Standard Organization (ISO) or Content Standard for Digital Geospatial Metadata (CSDGM) standards. Use the appropriate metadata structure to describe the data download and/or access Uniform Resource Locators (URLs).

Action 2.2.2. Include NGDA designation keyword tags and NGDA alternate titles in metadata to clearly identify NGDA Datasets within the Theme. Ensure the use of the same title in the metadata record and the NGDA Master Dataset List.

Action 2.2.3. Provide direct URLs to the NGDA Dataset, online resources, web services, APIs, and additional documentation per FGDC guidelines.

**Objective 2.3.** Provide reliable web services for Biodiversity and Ecosystems Theme datasets.

**Anticipated Outcomes.** NGDA Datasets for the Theme will be available as web services for efficient consumption and proliferation in web applications. More current data will be available to users through web services. Web services, Application Program Interfaces (APIs), press releases, and articles, will serve as gateways to data, tools, and products.

Action 2.3.1. Develop, maintain, and publish web services for Biodiversity and Ecosystems Theme datasets.

Action 2.3.2. Register Theme NGDA metadata with web services on the Geospatial Platform.

Action 2.3.3. Market web services to stakeholder community and encourage feedback from community.

## Goal 3

### **Goal 3: Engage the leadership and stakeholders of the Biodiversity and Ecosystems Theme Geospatial Community**

The Theme Lead and Theme Lead Agency are committed to providing leadership for and engaging with the Biodiversity and Ecosystems geospatial community. This community includes Dataset Managers and others from their agencies, as well as partners and collaborators, and data users from federal, tribal, state, county, local, private, and academic organizations.

**Objective 3.1.** Convene and engage the Biodiversity and Ecosystems Theme stakeholder community.

**Anticipated Outcomes.** Greater engagement, coordination, and information sharing across and among a number of stakeholder groups.

Action 3.1.1. Convene and engage the Dataset Managers to serve as an initial core group of subject matter experts who are knowledgeable on Biodiversity and Ecosystems NGDAs, aware of potential uses, and connected with the user community.

Action 3.1.2. Expand beyond the Dataset Managers to engage a larger network of data users and other stakeholders.

**Objective 3.2.** Lead the Biodiversity and Ecosystems community and advocate for shared resources.

**Anticipated Outcomes.** The Biodiversity and Ecosystems community will be more cohesive and engaged, and more aware of opportunities for collaborative work and shared resources.

Action 3.2.1. Conduct periodic meetings to bring the members of the Biodiversity and Ecosystems community together. Leverage opportunities for convening at common professional meetings.

Action 3.2.2. Explore and identify opportunities for collaborative work and cost sharing across and among stakeholder groups within the community. Encourage collaboration and the sharing of resources where realistic and appropriate.

**Objective 3.3.** Publicize the newly changed name of the Theme, which was previously known as the Biota Theme.

**Anticipated Outcomes.** Greater recognition and understanding of the Biodiversity and Ecosystems Theme and the NGDA Datasets contained therein.

Action 3.3.1. Ensure that the word “Biota” is changed to the term “Biodiversity and Ecosystems” where it appears in metadata, and other documentation and references, where applicable so the change will be carried through consistently.

Action 3.3.2. Ensure that the change is reflected in multiple places, such as the GeoPlatform.gov, FGDC annual reports, communications materials, FGDC.gov, and NGDA tools and reports. This also includes

the current list of 16 NGDAs in OMB Circular A-16, Appendix E: “NSDI Data Themes, Definitions, and Lead Agencies.”

Action 3.3.3. Seek opportunities to conduct outreach to existing and potential stakeholder groups.

**Objective 3.4.** Leverage GeoPlatform.gov to support the Biodiversity and Ecosystems Theme community.

**Anticipated Outcomes.** Use of GeoPlatform.gov will facilitate community access to Theme resources and will increase interest among stakeholders.

Action 3.4.1. Increase the use of the Biodiversity and Ecosystems Theme community on GeoPlatform.gov to take advantage of the shared infrastructure, technologies, and resources offered.

## External Factors, Challenges, and Opportunities

The Biodiversity and Ecosystems Theme community and the USGS face several challenges in implementing this strategic plan:

- Four of the seven Biodiversity and Ecosystems Theme NGDA Datasets are not owned/managed by USGS, making it difficult to ensure the implementation of the strategic goals.
- The three Biodiversity and Ecosystems Theme NGDA Datasets that are owned/managed by USGS include data from authoritative sources outside of the USGS. As such, the USGS is dependent on voluntary partnerships with local, state, federal, academic, and non-profit organizations to accomplish the goals and objectives for these datasets.
- The fast-changing pace of technology along with changing federal budgets, resources, and priorities creates a climate in which it is often difficult to see goals and objectives developed for future time horizons through to completion.
- The term “Biota,” which was previously used as the Theme name, caused some confusion as to what NGDAs should be included in the Theme, since several of the NGDAs were abiotic in nature.

Along with the above challenges, the Biodiversity and Ecosystems Theme community and the USGS also have opportunities to support the Theme’s goals:

- USGS is continuing to build partnerships both within the Department of Interior (DOI) and with non-DOI NDGA dataset owners/managers.
- USGS will explore collaborative opportunities with partner agencies to continue to update Biodiversity and Ecosystem related NGDA Datasets as needed, as well as consider new ones to add to the Theme.
- The development of the Biodiversity and Ecosystems Theme community on GeoPlatform.gov will facilitate the opportunities above for connections within the Biodiversity and Ecosystems community at large, resulting in increased opportunities for communication and collaboration.
- The availability of web mapping services will increase the visibility and use of these geospatial data assets.



- The recent name change from “Biota” to “Biodiversity and Ecosystems” has cleared up a great deal of confusion. The new name more accurately describes the Theme content and aligns with the terminology used by subject matter experts working in the field. More information on the name change is at:

<https://www.fgdc.gov/fgdc-news/biodiversity-and-ecosystems-ngda-theme>

## Implementation

Efforts are currently underway to develop implementation plans for all A-16 Themes. An initial template for these plans has been created, and A-16 Framework Theme Leads are in the process of developing their plans. The Biodiversity and Ecosystems Theme will be in the second round of plans, which will be developed in 2017.

## Roles and Responsibilities

Roles	Responsibilities
Executive Champion	Provides high-level sponsorship and support for the Biodiversity and Ecosystems Theme and associated NGDA Datasets; facilitates communication among the FGDC, other Executive Theme Champions, and agencies to promote effective and efficient development and management of Themes and their associated resources to benefit implementation.
Senior Agency Official for Geospatial Information	Oversees, coordinates, and facilitates the agency’s implementation of the geospatial-related requirements, policies, and activities. While distribution of these may cover various components of an agency, OMB will look to the senior agency official for information regarding the agency’s coordination of these activities.
Theme Lead	Coordinates and oversees the strategic planning and implementation of the Biodiversity and Ecosystems Theme and associated NGDA Datasets, and the development of annual Biodiversity and Ecosystems Theme Report.
NGDA Dataset Manager	Acts as primary data steward(s), directly develop(s) NGDA Datasets that fall under an NGDA Theme (in whole or part) in conjunction with other Dataset Managers and data stewards; works with Theme Lead to produce annual NGDA Dataset Reports.