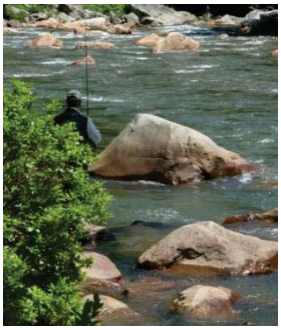
National Park Service

National River Data Inventory & Database Plan



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ABOUT THIS DOCUMENT

Coordinated through River Management Society, this plan seeks to inventory existing river data and attributes and help the National Park Service identify overall river data needs. It illustrates how existing National Park Service river data can support both a comprehensive administrative and planning tool for National Park Service staff and management and a friendly river resource for public users. This plan initiates the development of a dataset for the National Park Service that both serves an internal need for a reliable, value-added river database, and can contribute to the larger effort of creating a comprehensive, relevant, and user-friendly interagency national rivers database.

ABOUT RIVER MANAGEMENT SOCIETY

River Management Society is the only professional organization in North America dedicated to supporting professionals who study, protect, and manage North America's rivers. Its diverse membership includes federal, state, and local agency employees, educators, researchers, consultants, organizations, and citizens. River Management Society conducts and facilitates opportunities for professional education, training, and networking. It produces tools that serve the needs of a diverse collection of river professionals. By working with professionals across and beyond organizational and agency boundaries, River Management Society serves the professional river community uniquely and efficiently.

For decades, River Management Society has coordinated with federal river-managing agencies to provide basic information to assist boaters in planning river trips. In early 2000, the Bureau of Land Management partnered with River Management Society and American Whitewater—a national nonprofit organization whose mission is "to conserve and restore America's whitewater resources and to enhance opportunities to enjoy them safely"—to update their river information and create a cost-effective and user-friendly interface for the Bureau of Land Management's river data. The product, the *National Bureau of Land Management River Database*, is a Web-enabled database that contains all floatable/boatable sections of rivers and creeks for which the Bureau of Land Management has management responsibilities. Each river section is linked to American Whitewater's comprehensive Web database of whitewater river sections, Bureau of Land Management office contact information, and the United States Geological Survey's real-time stream gauge levels. The database provides a clearinghouse of river management and detailed boater information, and its added functionality of accommodating multiple users allows Bureau of Land Management river managers to update the database as needed. The database is hosted by River Management Society for the purposes of avoiding security issues invited by its public interface and providing other agencies an opportunity to incorporate their river data.

Working with Downstream Strategies to develop this plan, River Management Society coordinated feedback from key project stakeholders within the National Park Service throughout the process, specifically on the draft plan. It also coordinated with project stakeholders within its organization to solicit their feedback.

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- Peter Budde, Natural Resources GIS Program Coordinator, Natural Resources Program, National Park Service
- Margaret Beer, Data Manager, Inventory and Monitoring Division, National Park Service

ABBREVIATIONS

AK	Alaska
AW	American Whitewater
BLM	Bureau of Land Management
HI	Hawaii
HUC	hydrologic unit code
IWSRCC	Interagency Wild and Scenic Rivers Coordinating Council
GIS	geographic information system
L48	Lower 48
NHD	National Hydrography Dataset
NPS	National Park Service
NRI	Nationwide Rivers Inventory
ORV	outstandingly remarkable value
PDF	portable document format
PR	Puerto Rico
RMS	River Management Society
USFS	United States Forest Service
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
WSR	Wild and Scenic River

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1. INTRODUCTION

The authority of the United States (US) National Park Service (NPS) to manage parks and to determine appropriate resource use opportunities extends beyond its land-based assets to rivers and other water resources. As river recreation levels and stewardship efforts have grown, it has become increasingly important to provide planners and the public with reliable, up-to-date information. However, NPS does not have an agency-wide river database that details rivers flowing through and adjacent to its parks. While the Interagency Wild and Scenic Rivers Coordinating Council (IWSRCC) data and the Nationwide Rivers Inventory (NRI) have provided placeholders for many data needs, an inventory and database of rivers managed by NPS seems necessary to provide cohesive river information to NPS river managers, river users, and other stakeholders such as river advocacy or education groups.

Within NPS, there is discussion about developing a national rivers atlas, improving the Rec.gov Web site, developing tools for water trails, updating the NRI, and creating an interactive map for the National Wild and Scenic Rivers System. This project can serve as a platform for the development of a reliable, value-added river database to serve the internal needs of NPS and contribute to the larger effort of creating a comprehensive, relevant, and user-friendly national rivers database for the public.

Specific objectives of this project include the following:

- Identify relevant existing NPS databases, data dictionaries, and agency resources.
- Identify the scope, attributes, and data needs (e.g., updates, new attributes) for each data source.
- Identify overall desired data and, as a possible subset, data that are currently obtainable.
- Initiate a plan for the creation of an NPS database that can be shared across agencies.

Initial planning meetings on the phone with the Downstream Strategies/River Management Society (RMS) project team provided an opportunity for NPS to review and approve the inventory methods and database scope. As a result of the preliminary research and meetings, the team fully understood existing resources and the desired product and developed a clear relationship with key partners.

2. EXISTING DATA

For this document, existing data sources were assessed to determine the following information for rivers under NPS management or oversight:

- Metadata, including extent, scale/geographic information system (GIS) resolution, description, year (origin or updated), and source
- Attributes
- Data needs (i.e., necessary data updates, additions of new attributes), if applicable

While this plan focuses on rivers under NPS management or oversight, several national databases and listings are relevant to this project. These databases and listings include the following:

- **National park boundaries** are available here: https://irma.nps.gov/App/Portal/Topics/Geospatial.
- **NPS unit contacts and the "Red Book,"** a listing of designated national parks, as well as other agency-specific information, found here: http://www.nps.gov/news/researchlinks.htm. The Red Book can be found here: http://www.nps.gov/history/history/online_books/nps/index2009_11.pdf.
- **"Find a Park" on the NPS Web site**: http://www.nps.gov/findapark/index.htm.
- **NRI** is available here: http://www.nps.gov/ncrc/programs/rtca/nri/.
- **Wild and Scenic Rivers (WSRs)** are listed on the IWSRCC Web site: www.rivers.gov.
    - The portable document format (PDF) listing is available here: http://rivers.gov/publications/rivers-table.pdf.
    - IWSRCC also has a downloadable GIS file of designated rivers, available here: http://rivers.gov/maps.html.
    - IWSRCC has also developed a framework (i.e., data dictionary) based on two existing databases used by the US Forest Service (USFS) for a national database for designated and candidate (i.e., eligible for designation) rivers. This will be discussed in this plan.
- American Whitewater's (AW's) **Google Earth layer of designated Wild and Scenic Rivers** is available here: http://www.americanwhitewater.org/content/Document/view/documentid/277/.
- AW's **Google Earth layer of USFS rivers evaluated for inclusion in the WSR system** is available here: http://www.americanwhitewater.org/content/Document/view/documentid/344.

Other relevant national databases that *may also be used* in the data needs assessment include the following:

- **AW's National Whitewater Inventory**: http://www.americanwhitewater.org/content/River/view/.
- **National Bureau of Land Management (BLM) River Database** public site**:** http://rivers.river-management.org/.Private site: http://rivers.river-management.org/.
- **National Hydrography Dataset** (NHD) GIS data and applications from United States Geological Survey (USGS) are available here: http://nhd.usgs.gov/index.html. The NHD can be obtained from http://nhd.usgs.gov/data.html.
- **The Hydrographic & Impairment Statistics Database** houses water quality information for national parks and is available here: http://nature.nps.gov/water/HIS/index.cfm.

2.1 National Park Service administrative information

2.1.1 *The National Parks: Index 2009-2011 (The Red Book)*

NPS maintains an internal agency listing of all designated units within the National Park System, which is referred to within the agency as the Red Book. This is one source of administrative information for NPS.

Attributes

The narrative listing includes the following information/attributes:

- park name;
- region (Alaska (AKR), Intermountain (IMR), Midwest (MWR), National Capital (NCR), Northeast (NER), Pacific West (PWR), and Southeast (SER));
- designation type; and
- contact information including
    - phone number,
    - address,
    - state, and
    - zip code.

The Red Book includes other information that may be relevant to a future river database, such as:

- park narrative description,
- public law number and date, and
- various designated acreages.

A narrative version of this dataset is accessible by the general public via the NPS Web site. The NPS Public Affairs Office has a spreadsheet of information for the parks, including all of the following attributes (*Note*: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- Unit (i.e., name; e.g., ACADIA);
- Type (i.e., NHP, NP, NM, WR, NHS, NRA, NPRES, NB, NL, NST, NMEM, NS, NP&PRES, NR&RA, PW, NSR, OTHER, NR, PARK, NMP, MEMPW, S&RR, PRES, MEM, NBP, W&SR);
- Code [e.g., ABLI (Abraham Lincoln's Birthplace)];
- Region (e.g., SER; see above for list);
- Supt. (i.e., superintendent name, e.g., Joe Mann);
- Address;
- Phone [e.g., (270) 358-3874];
- Supt. Phone (i.e., superintendent phone); and
- Fax [e.g., (270) 358-3874].

2.1.2 *National Park Service "Find a Park"*

NPS maintains a "Find a Park" link on its Web site, which houses publicly available and searchable administrative information for national parks. This search function allows public users to search for parks by name, location, activity (e.g., swimming or boating), topic, or state. The database behind this search engine can inform any river-specific NPS database. Conversely, a river-specific database can serve to provide more detailed information to enhance this existing framework.

Attributes

Each Web site, linked through the "Find a Park" search function, contains the following relevant attributes:

- river description;
- contact information, including address, state, email, phone, and fax;
- directions;
- operating hours;
- fees and reservations;
- river trips/permitting (*where applicable*);
- riparian assessment (*where applicable*);
- link to USGS river level gauge (*where applicable*);
- link to private Web sites, such as AW's whitewater page (*where applicable*);
- park management/park planning information (*where applicable*);
- photos/multimedia/Facebook (*where applicable*);
- Web cams (*where applicable, e.g., Grand Canyon*); and
- many other attributes.

2.2 National park boundaries

2.2.1 *Metadata*

- **Description**: not available
- **Year**: 11/30/2011
- **Extent**: US states and holdings(Puerto Rico, American Samoa, Pacific Ocean)
- **Scale/GIS resolution** (e.g., 1:24k, 1:100k, 1:2M): not available
- **Source**: NPS Land Resources Division. 2011. Current administrative boundaries of National Park System units 11/28/2011. Geospatial Dataset-2181146. Reference Code: 2181146. Reference Status as of 11/30/2011: Active. Visibility: Public.

2.2.2 *Attributes*

Attributes include the following (*Note*: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- UNIT_TYPE:
  - Ecological and Historical Preserve
  - Historical Park
  - International Historic Site
  - National Battlefield
  - National Battlefield Park
  - National Battlefield Site
  - National Heritage Corridor
  - National Historic Park
  - National Historic Site
  - National Historic Trail
  - National Historical Park
  - National Historical Park and Preserve
  - National Historical Reserve
  - National Historical Site
  - National Lakeshore
  - National Memorial
  - National Military Park
  - National Monument
  - National Monument and Historic Shrine
  - National Park
  - National Parkway
  - National Preserve
  - National Recreation Area
  - National Recreation River
  - National Reserve
  - National River
  - National River and Recreation Area
  - National Scenic River
  - National Scenic Trail
  - National Seashore
  - National Wild and Scenic Riverway
  - National Wild River
  - Other Designation
  - Park
  - Parkway
  - Scenic and Recreational River
  - Wild and Scenic River
- STATE (*Note: some not populated*)
- REGION
  - AK (i.e., Alaska)
  - IM (i.e., Intermountain)
  - MW (i.e., Midwest)
  - NC (i.e., National Capital)
  - NE (i.e., Northeast)
  - PW (i.e., Pacific West)
  - SE (i.e., Southeast)
- UNIT_CODE [e.g., ABLI (Abraham Lincoln's Birthplace)]
- UNIT_NAME (i.e., name of park; e.g., West Potomac Park)
- DATE_EDIT (e.g., 6/6/2006)
- GIS_NOTES
- CREATED_BY (i.e., Legacy, Lands)
- METADATA (e.g., http://nrdata.nps.gov/programs/Lands/BLCA_metadata.xml)
- PARK NAME (e.g., Black Canyon of the Gunnison)

2.3 Nationwide Rivers Inventory

The NRI is a listing of more than 3,400 free-flowing river segments in the US that are believed to possess one or more outstandingly remarkable values (ORVs), either natural or cultural, which are judged to be of more than local or regional significance.

2.3.1 *Metadata*

Description: The ArcGIS shapefiles are a digital line cover representing river and river segments that are catalogued in the NRI. The metadata states:

> The…NRI…is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more 'outstandingly remarkable' natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential directive, and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. The NRI is a source of information for statewide river assessments and federal agencies involved with stream-related projects. For any group concerned with ecosystem management, the inventory can provide the location of the nearest naturally-functioning system which might serve as a reference for monitoring activities. It also serves as a listing of plant and animal species for restoration efforts on a similar section of river. For the recreationalist, it provides a listing of free-flowing, relatively undisturbed river segments.

Year: 1993 (initial dataset), updated in 1996. From the associated "read me" document:

> The original inventory was conducted by the Department of Interior with the cooperation of State and local agencies, and completed in 1982. A major update of the NRI was initiated in 1993. The second phase of the NRI update, initiated in 1994, added river segments found eligible through statewide river assessments and inventories. GIS and watershed referencing for all NRI segments will complete the update.

Extent: The data include files from the following US locations: Continental US, Alaska, Hawaii, and Puerto Rico. Table 1 lists additional information about the geographic extent of the NRI data files.

Table 1: Nationwide Rivers Inventory geographic data extent and scope

Location	Length	Number of river segments
Continental United States	63,264 miles	2,601
Alaska	4,612 miles	194
Hawaii	231,923 meters	26
Puerto Rico	34,168 meters	14
Total		**2,835**

Source: Nationwide Rivers Inventory shapefile (zipped file dated October 2011; individual files dated April 2010). Notes: Units of measurement were retained from individual files. These files do not include 600 river segments that were added after the GIS data were published; GIS data are not currently available for these sections.

Scale/GIS resolution (e.g., 1:24k, 1:100k, 1:2M): not available

Source: NRI GIS data maintained by NPS and available by request here: http://www.nps.gov/ncrc/programs/rtca/nri/.

2.3.2 *Attributes*

Attributes include the following (*Note*: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- NRI_ (i.e., count);
- NRI_ID;
- PRJID;
- geometry_i;
- OID_;
- PRJID_1;
- STATE;
- RIVER;
- OTHSTATE (i.e., other state);
- COUNTY;
- REACH;
- LENGTH (i.e., number value);
- pr_info_da (i.e., number value);
- SCENIC;
- RECREATIONAL;
- GEOLOGIC;
- FISH;
- WILDLIFE;
- HISTORIC;
- CULTURAL;
- OTHER (i.e., ORV);
- PARKNAME;
- LISTING (i.e., year, e.g., Lower 48 (L48) file=1982, 1993, Alaska (AK) file=1993, Hawaii (HI) files=1982, Puerto Rico (PR) file=1993);
- UPDATE;
- OID_1 (i.e., numeric);
- PRJID_12; and
- DESCRIP (i.e., description).

2.4 Wild and Scenic River list

WSRs are listed on the IWSRCC Web site at http://rivers.gov/. This site lists designated rivers by management agency. As of October 2011, 203 rivers were listed, with 12,597 total designated miles in the continental US and Puerto Rico. This PDF file includes the following attributes:

- river;
- state;
- public law number and date;
- administering agency;
- miles by classification (wild, scenic, recreational); and
- total miles.

2.5 Wild and Scenic River GIS files

IWSRCC provides a GIS file of designated WSRs at http://rivers.gov/maps.html. IWSRCC has also developed an attribute data dictionary based on two existing databases used by USFS for a national database for designated and candidate rivers.

2.5.1 *Metadata*

Description: These GIS files include river segments representing the National Wild and Scenic River System for the continental US and Alaska.

Year: The data include designations as recent as April 2009.

Source: Data were compiled by a consortium of the USGS National Atlas and IWSRCC.

Extent: The data include files for the continental US and Alaska. Table 2 lists additional information about the extent and scope of these data files.

Scale/GIS resolution (e.g., 1:24k, 1:100k, 1:2M): Table 2 lists resolution information for these data files.

Table 2: Wild and Scenic River GIS files' extent, scope, and resolution

Location (File name)	GIS resolution	Number of river segments	Total length (meters)
Continental US (Master_Conus_WSR2009_Oct20)	1:2M or 1:24k	2,030	12,135,960
Alaska (MasterAlaskaWSR)	1:2M	83	3,882,489
Total		**2,835**	**16,018,449**

Note: Continental US file includes Puerto Rico. WSR segments before 2000 were collected at 1:2M scale; segments added after 2000 were generally collected at 1:24k scale. Data collected at a smaller scale (1:2M) are less precise than that collected at a larger scale (1:24k).

2.5.2 *Attributes*

The Continental US file includes the following attributes (*Note*: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- NAME
- FEATURE
- NAME2
- FNODE_
- TNODE_
- LPOLY_
- RPOLY_
- LENGTH
- STREAMNAME
- LSTREAMNAM
- Comments
- WSRSEGS_92
- WSRSEGS_93
- Id
- Shape_Leng
- Agency
- Class
- YEAR

The attributes that are only partially populated include: LENGTH, STREAMNAME, LSTREAMNAM; the attributes are only partially populated in the US file include: FEATURE, Comments, Agency, and Class.

Note three main points regarding the length attribute: (a) unit of length is meters; (b) total length converts to less than 10,000 miles, which is less than the 12,597 total miles in the PDF listing discussed in Section 2.4; and (c) many listings that appear as measureable segments within GIS are listed with a length of "0" in the associated attribute spreadsheet. Within the Continental US file, a total of 103 rivers and creeks have an associated value of "0" for the attribute "LENGTH," including the following:

- Eightmile River
- Wekiva River
- Lamprey River
- Westfield River
- Niobrara River
- White Clay Creek
- Musconetcong River
- Wilson Creek
- Rio de La Mina
- Rio Icacos
- Rio Mameyes
- Buffalo River
- Allagash River
- Saint Joe River
- Collawash River
- Eagle Creek
- East Fork Hood River
- Fifteenmile Creek
- Fish Creek
- Middle Fork Hood River
- South Fork Clackamas River
- Zigzag River
- South Fork Roaring River
- North Fork Elk River
- South Fork Elk River
- Owens River Headwaters
- Cottonwood Creek
- Piru Creek
- Fuller Mill Creek
- North Fork San Jacinto River
- Bautista Creek
- Palm Canyon Creek
- Amargosa River
- Fossil Creek
- Big Jacks Creek
- South Fork Owyhee River
- Owyhee River
- Red Canyon
- Jarbidge River
- Deep Creek
- Bruneau River
- Wickahoney Creek
- Battle Creek
- North Fork Owyhee River
- Sheep Creek
- Little Jacks Creek
- Duncan Creek
- West Fork Bruneau River
- Dickshooter Creek
- Timber Creek
- North Fork Virgin River
- Bear Trap Canyon
- La Verkin Creek
- Oak Creek
- Left Fork North Creek
- Mystery Canyon
- Pine Spring Wash
- Pine Creek
- Imlay Canyon
- Russell Gulch
- North Fork Taylor Creek
- South Fork Taylor Creek
- Birch Creek
- Heaps Canyon
- Behunin Canyon
- Little Creek
- Virgin River
- Kolob Creek
- Wolf Spring Wash
- Grapevine Wash
- Hop Valley Creek
- Currant Creek
- Cane Creek
- Goose Creek
- Middle Fork Taylor Creek
- Taylor Creek
- North Creek
- Right Fork North Creek
- Blue Creek
- Orderville Canyon
- Echo Canyon
- Clear Creek
- Shunes Creek
- East Fork Virgin River
- Willis Creek
- Smith Creek
- Taunton River
- Gros Ventre River
- Pacific Creek
- Buffalo Fork
- Snake River
- Lewis River
- Bailey Creek
- Blackrock Creek
- Crystal Creek
- Granite Creek
- Hoback River
- North Buffalo Fork
- Shoal Creek
- Soda Fork
- South Buffalo Fork
- Willow Creek
- Wolf Creek

Noticeably different from the Continental US file, the Alaska file includes the following attributes (*Note*: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- FNODE_
- TNODE_
- LPOLY_
- RPOLY_
- LENGTH
- FEDLANL020
- NAME
- FEATURE
- STARTX_COO
- STARTY_COO
- ENDX_COORD
- ENDY_COORD

2.6 Wild and Scenic River Google Earth files

AW recently developed a Google Earth layer of designated WSRs based on GIS data available from the federal river management agencies. The layer includes the newly designated rivers that were protected with the Omnibus Public Lands Act of 2009, and it can be downloaded.

In coordination with USFS, AW also developed a Google Earth layer of candidate WSRs—rivers that have been evaluated for inclusion in the WSR system—based on GIS data from USFS. This dataset includes segments that are eligible and recommended as suitable for WSR designation by USFS. Attributes of the data for each river section include the section's ORVs, as well as the WSR classification.

These Google Earth datasets do not appear to have any associated metadata or attributes. In other words, one can view the rivers in Google Earth, but no tabular information is available about their locations, names, or lengths. These and future Google Earth files would be more useful if they were updated to include recent additions as well as associated relevant data. However, these files demonstrate what can be done to make data more publicly available and accessible.

2.7 USFS Wild and Scenic River databases

USFS houses information on river sections managed by USFS for both designated and candidate rivers in the WSR system. IWSRCC used these existing Microsoft Access databases—internal to USFS—to develop the interagency attribute data dictionary for WSRs.

Attributes

The USFS *candidate* WSR database includes the following attributes:

- river name
- status (i.e., eligible, suitable)
- statute
- security id
- decision date
- study transmitted (i.e., Y/N)
- transmittal date
- state
- managing NF name
- lead unit
- segment #
- classification
- miles
- BP narrative
- EP narrative
- ORV

2.8 IWSRCC Wild and Scenic River attribute data dictionary

IWSRCC has developed an attribute data dictionary for a proposed interagency national database for designated WSRs. This database framework was developed by IWSRCC, based in part on an existing Microsoft Access database internal to USFS.

Attributes

The proposed interagency designated WSR database includes the following attributes (Note: the conventions of the data source were used for these attributes, including capitalization and punctuation):

River level

- River Name (text)
- River Narrative (text)
- BP Narrative (text)
- EP Narrative (text)
- Miles (numeric)
- Other designated segments (Y/N)
- Administering Agencies (numeric 1-5)
- Managing Entities (numeric 1-6)
- Contact Information (text)
- Address (text)
- Phone number (text)
- Local River Website Name (text)
- Local River Website (link)
- State (text)
- County (text)
- Congressional District (text)
- Public Law Number (text)
- Public Law Name (text)
- Enacted Date (date)
- Management Plan (Y/N)

Segment level

- BP Narrative (text)
- EP Narrative (text)
- Local Name (text)
- Miles (numeric)
- Classification (numeric 1-3)
- HUC ID (numeric)

ORV List

- Scenic (Y/N)
- Scenic Narrative (text)
- Recreational (Y/N)
- Recreational Narrative (text)
- Geologic (Y/N)
- Geologic Narrative (text)
- Fish (Y/N)
- Fish Narrative (text)
- Wildlife (Y/N)
- Wildlife Narrative (text)
- Historic (Y/N)
- Historic Narrative (text)
- Cultural (Y/N)
- Cultural Narrative (text)
- Other Similar Value (numeric 1-7)
- Other Narrative (text)

These attributes are further defined in IWSRCC's working document, *Data Dictionary for Wild and Scenic River Attribute Database*.

2.9 National Bureau of Land Management River Database

In early 2000, BLM partnered with RMS and AW to update its river information and create a cost-effective and user-friendly interface for BLM's river data. The resulting product is a Web-enabled database that contains all floatable, boatable sections of rivers and creeks for which BLM has management responsibilities. It is linked to AW's database of whitewater river sections, BLM office contact information, and USGS's real-time stream gauge levels. The database is a clearinghouse of river user and management information, and its added accommodation of multiple users allows BLM river managers to update the database as needed. The BLM database was developed on the same platform as AW's to allow linkages between the two databases; the AW database serves as a foundation for the BLM database. The database is hosted by RMS to avoid the challenges of agency bureaucracy and for the purpose of providing other agencies an opportunity to incorporate their river data.

This database is searchable by many attributes, including WSR designation. However, it does not include a comprehensive listing of either candidate or designated WSRs; it only includes those river sections that are floatable or boatable (not all WSRs meet one or both criteria). A unique ID was created for each river section in anticipation of adding WSR data to this database to improve its comprehensiveness, and, although not in

the online database, BLM collects and updates WSR data at its national office. These updates could be added to this existing database with minor database enhancements.

Attributes

Attributes for the affiliated office for each river section include the following (Note: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- officecode (i.e., internal to BLM)
- jurisdiction (i.e., field or state office)
- officename (e.g., Glenallen Field Office)
- officeaddress (e.g., 222 Oak Lane)
- officecity (e.g., Rivertown)
- officestate (e.g., CA)
- officezip (e.g., 23456)
- officephonearea (e.g., 303)
- officephoneprefix (e.g., 245)
- officephonesuffix (e.g., 4545)
- rivercontact (i.e., name of river manager)
- contactphonearea
- contactphoneprefix
- contactphonesuffix
- website

Beyond office information, other attributes for the river database for each river section include the following (Note: the conventions of the data source were used for these attributes, including capitalization and punctuation):

- sectionid (i.e., unique id)
- mlevel (i.e., management level)
- state1
- state2
- office1
- office2
- rivername
- section
- accessnotes
- managenotes
- blmnotes
- putin
- takeout
- otheraccess
- length
- blmmiles (agency miles)
- plat
- plon
- tlat
- tlon
- difficulty
- designationother
- subregion (i.e., drainage)
- huc
- otherofficeagency
- otherofficename
- otherofficeaddress
- otherofficecity
- otherofficestate
- otherofficezip
- otherofficephonearea
- otherofficephoneprefix
- otherofficephonesuffix
- otherofficewebsite
- gauge
- fee
- permittypecode
- permittypeother
- permitsite
- litigation
- rmp (i.e., park plan)
- crmp (i.e., river plan)
- accessissues
- accesscomments
- photo
- caption
- lastupdated

Appendix A and B contain the glossary and data dictionary for all National BLM River Database attributes.

2.10 American Whitewater's National Whitewater River Inventory

AW's National Whitewater River Inventory is a Web-based river database for whitewater boaters to use to obtain information about whitewater river sections nationwide. Much like a guidebook, the database is organized by state and whitewater section. Each river page includes a description and a color-coding indicating the difficulty of specific reaches, and is linked to real-time flow data that is updated every 15 seconds. This database is the most comprehensive online source of whitewater river information available, and it includes photos and Google Earth applications. The BLM database was developed on the same platform to allow linkages between the two; the AW database served as a foundation for the BLM database.

AW's database includes two attributes for whitewater river sections nationwide that are unique among the databases considered in this report: geospatial information for access points and links to USGS gauges for each section. It does not contain non-whitewater sections, and it only contains limited river management information, such as management agencies or contact information. It is recommended to collaborate with AW to support the use of this database as the foundation of the existing BLM river data infrastructure, and to minimize development redundancy.

2.11 National Hydrography Dataset

The NHD includes GIS data and applications from USGS that describe lakes, ponds, streams, rivers, canals, dams, and stream gages. These data are designed to be used in general mapping and in the analysis of surface water systems. The NHD is a comprehensive resource that NPS and other agencies could use to help create or update river data in the future (e.g., updating resolution of WSR data).

Summary

From the metadata:

> The NHD is a national framework for assigning reach addresses to water-related entities, such as industrial discharges, drinking water supplies, fish habitat areas, wild and scenic rivers. Reach addresses establish the locations of these entities relative to one another within the NHD surface water drainage network, much like addresses on streets. Once linked to the NHD by their reach addresses, the upstream/downstream relationships of these water-related entities--and any associated information about them--can be analyzed using software tools ranging from spreadsheets to geographic information systems (GIS). GIS can also be used to combine NHD-based network analysis with other data layers, such as soils, land use and population, to help understand and display their respective effects upon one another. Furthermore, because the NHD provides a nationally consistent framework for addressing and analysis, water-related information linked to reach addresses by one organization (national, state, local) can be shared with other organizations and easily integrated into many different types of applications to the benefit of all.

Description

From the metadata:

> The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD data was originally developed at 1:100,000-scale and exists at that scale for the whole country. This high-resolution NHD, generally developed at 1:24,000/1:12,000 scale, adds detail to the original 1:100,000-scale NHD. (Data for Alaska, Puerto Rico and the Virgin Islands was developed at high-resolution, not 1:100,000 scale.) Local resolution NHD is being developed where partners and data exist.

The NHD contains reach codes for networked features, flow direction, names, and centerline representations for areal water bodies. Reaches are also defined on waterbodies and the approximate shorelines of the Great Lakes, the Atlantic and Pacific Oceans and the Gulf of Mexico. The NHD also incorporates the National Spatial Data Infrastructure framework criteria established by the Federal Geographic Data Committee. Last Updated May, 2006.

3. DATA UPDATE NEEDS

3.1 National Park boundaries

This dataset contains useful information for a future NPS river database. However, the metadata is missing a description, as well as information on its resolution. Rather than updating or adding attributes to the park boundaries dataset, it should be used as-is, as an existing dataset for future river database needs. Independent of how this dataset is used, we offer the following suggestions:

Populate existing attributes with missing data. The following attributes are not fully populated: STATE, DATE_EDIT, GIS_NOTES, METADATA, and PARK NAME. It would also be helpful to determine the data resolution, if known. The GIS_NOTES attribute contains information that may guide future updates.

Edit existing attributes. Two existing attributes should be updated or edited: REGION and GIS_NOTES. The information in the attribute GIS_NOTES may guide future updates to the associated geospatial information. Additionally, within the REGION attribute, two listings seem inconsistent with NPS regions: (a) Maggie L. Walker is listed as "ME" rather than "NE," and (b) Blue Ridge Parkway is listed as "NT" rather than "SE."

3.2 Nationwide Rivers Inventory

We suggest the following data updates:

Add a map to the Web site. In the short term, a PDF map would help communicate the scope of this rivers inventory. In the future, data could be made available for public viewing and downloading via an interactive Web-enabled map that shows all listed rivers and their associated attributes. This would provide a service to the public and reduce NPS time associated with manually creating and sending files.

Use a common unit for length. The attribute "LENGTH" differs between GIS datasets; Hawaii and Puerto Rico GIS files use meters, whereas the lower 48 and Alaska GIS files use miles. The Web site listing uses miles as the unit for length in all datasets. The NRI attributes should be consistent across all NRI datasets.

Consolidate overlapping segments. Some listed river segments are repetitive; these overlapping segments should be removed or cleaned.

Populate missing attribute data. Each NRI file (e.g., Lower 48, Hawaii) has at least one attribute (e.g., Park name) in need of updates/data population. The attribute "Park name," however, has only been populated with NPS units; data is missing for all other management entities (e.g., BLM, USFS). The current NRI listing can be updated incrementally by populating the current missing attributes; Table 3 summarizes attribute updates and amounts.

Table 3: Nationwide Rivers Inventory attribute updates needed

NRI file	geometry_i	OID_	PRJID_1	Descrip	OID_1	PRJID_12	County	Park name	Update	pr_info_da
Lower 48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N=1,433	X	X
Alaska	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X	X
Hawaii	X	n/a	X	n/a	X	X	n/a	N=25	X	X
Puerto Rico	X	X	X	N=14	X	X	N=14	N=1	X	n/a

Note: X=attribute present in data, no updates needed; n/a= attribute not present in data, potential updates needed; N=the number of updates needed.

Specifically, the following attribute updates are necessary:

- geometry_i (*Note*: only in the L48 file; AK, HI, and PR do not have this attribute);
- OTHSTATE (*Note*: the AK file does not have this attribute; both HI and PR have this attribute, but all listings are populated with "NONE," since no adjacent states exist in these places);
- COUNTY (*Note*: the PR file does not have this attribute);
- pr_info_da (*Note:* this attribute is only in the PR file);
- PARKNAME (*Note*: the L48 and HI files are populated with NPS park names; when managed by another agency, this field is not populated. Consider changing the attribute name or adding a new attribute to include other management entities' management area names.);
- UPDATE (*Note*: the AK and HI files do not have this attribute; the L48 file is only partially populated);
- DESCRIP (*Note*: the L48 file is only partially populated).

Update NRI data. Updates to the NRI could include the following:

- status changes since the 1993/1995 update—identify all status updates first, then determine if updates are necessary to include or exclude segments that are eligible, non-suitable, or designated;
- candidate rivers from agencies beyond NPS, or a Web link to eligible rivers for each agency or entity; GIS resolution, or improvement where applicable—a goal would be to achieve 1:24k;
- GIS data for the additional 600 segments not currently listed in the published GIS file; and
- confirmation and publication of the most recent official number of segments.

Creating a single official listing of NRI files can address numeric discrepancies and ensure that the most current and comprehensive files are available to the public via GIS data and a Web site listing. If the 600 segments not currently listed in the GIS files were added to all 2,835 sections in the GIS file, a total of 3,435 sections should be recorded. As part of the data inventory process to create this plan, it was found that an internal Microsoft Access file (95UPDATE_07access.accdb) managed by NPS seems to contain the most current and comprehensive NRI listings. This file has a total of 3,431 sections totaling 84,633.6 miles, and includes HI, PR, AK, and L48. Additions or updates may need to be added to create an updated single official NRI listing. (Note*:* The file does not include Rhode Island's Buckeye Brook.)

Add and populate new attributes. Potentially add and populate new attributes for each segment, including:

- "Management entity" (i.e., USFS, US Fish and Wildlife Service (USFWS), NPS, BLM, state);
- "Management area name," or consider changing attribute "PARKNAME" to include other non-NPS areas;
- "Management code" (i.e., identifying code, such as an alphanumeric code, used to identify an individual management entity);
- potential classification (i.e., wild, scenic, recreational)—this attribute is currently available on the NRI Web site, but not in the GIS data; and
- management plan information, such as, "Has this river been studied through a land management plan (y/n)," as well as a link to the study. USFS collects this information, which would be useful for the NRI to provide.

The name of the entity that manages the listed river is not represented in the NRI dataset and would be useful. In the future, a GIS analysis can determine the agency name for each NRI segment for at least four federal land management agencies: NPS, BLM, USFS, and USFWS.

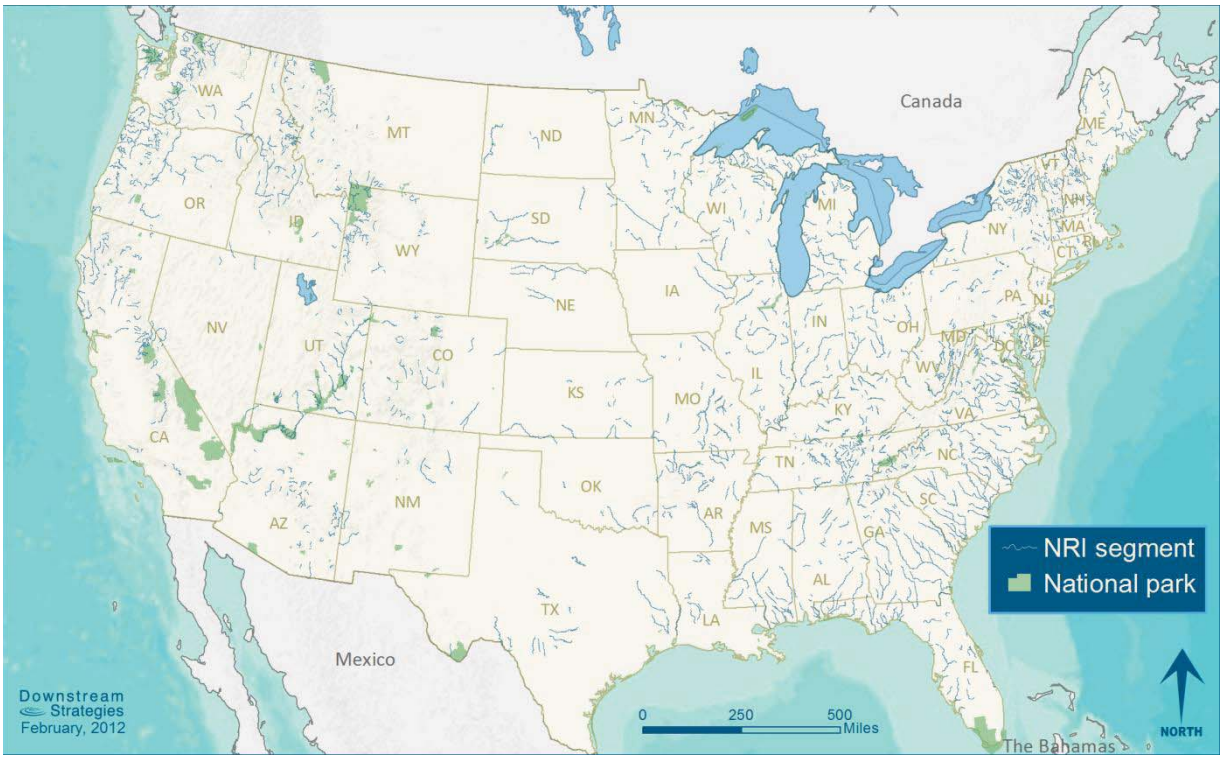
All NRI rivers and national park boundaries are shown in Figure 1 and Figure 2. To generate a dataset of all NRI rivers that flow through national parks, a spatial query was performed in ArcGIS by Downstream Strategies. Using the *Select By Location* tool, NRI features that intersected NPS features were selected, thereby generating a list of all rivers on the most recent NRI within park boundaries in the US. According to

this exercise, 243 NRI river segments lie within park boundaries. A spreadsheet of the merged datasets that resulted from this analysis was provided to NPS as part of this project.

Future analysis could perform a similar geospatial query using the NRI data and land status that includes other entities such as state and other national land management agencies. This analysis would help to populate the management entity of each listed section. It would generate an initial dataset that would need to be further populated with additional attributes; the NHD dataset, for example, does not classify rivers by floatable/boatable or list access points or sections with specific designations such as WSR.

One challenge of this analysis stems from the difference between the geographic scale of the park boundaries dataset (unknown) and the NHD scale (1:24k or 1:100k). At low resolution, intricacies in the river's path and park boundaries are lost, and rivers near the borders of parks may be incorrectly classified.

Figure 1: Nationwide Rivers Inventory segments and national park boundaries in the lower 48 states



Note: NRI=Nationwide Rivers Inventory

Figure 2: Nationwide Rivers Inventory segments and national park boundaries in Alaska and Hawaii

Note: NRI=Nationwide Rivers Inventory

3.3 Wild and Scenic River GIS files

This dataset contains useful information for a future NPS river database, although it is not fully populated. We offer the following suggestions for data updates and needs:

Make GIS files' attributes correspond to each other. The GIS files each contain different attributes (Section 2.5). For the files to correspond, the Alaska file will need additional attributes from the Continental US file.

Populate existing attributes with missing data. Many of the attributes listed in both Continental US and Alaska files are only partially populated. Within the Continental US file, for example, 103 rivers have a value of "0" for the attribute "LENGTH." The units and values are both inconsistent between the WSR GIS files and PDF listing. The PDF file lists 12,597 miles. The GIS files uses meters as units; converted, the mileage totals less than 10,000 miles. Populating the missing length values listed in Section 2.5.2 may help attain numeric consistency. Other attributes that are only partially populated include the following: LENGTH, STREAMNAME, LSTREAMNAM, FEATURE (in US file only), Comments (in US file only), Agency (in US file only), and Class (in US file only).

Add new attributes. Adding one or more length attribute may help with length discrepancies in the WSR datasets. Due to how WSRs are designated, the number of miles listed in the legislation may differ from the actual length of the WSR segment. Adding attributes such as "policy length" and "actual length" can serve to differentiate between the types of WSR segment lengths.

In addition, the attributes of the WSR GIS files do not include start and end point GIS coordinates, as mentioned in Section 2.5. These two new attributes could assist with future efforts to merge GIS files and the WSR attribute data dictionary. Analysis can be done within GIS to generate beginning and end points.

Alternatively, GIS analysis can generate lines from the NHD, once points are known; however, this technique can prove difficult if the points used are not exactly on top of the line in the NHD shapefile. It would be ideal to have GIS shapefiles for all rivers/river sections, if possible, rather than point data.

IWSRCC has established a leadership role in developing a data dictionary for attributes for an interagency WSR database. Data needs for these GIS files should represent what reasonably supports the goals and objectives of IWSRCC.

Merge GIS files and attribute data. The GIS files and attribute data dictionary can be merged to create a single source of WSR data. Although GIS data may not exist for all WSRs, the attributes could be similarly organized for future merging. Units of length differ between GIS files and attribute data: the former uses meters, whereas the attribute data list miles. As mentioned in Section 2.5, the PDF and GIS files contain different values for segments and miles. The process of merging these files can help to better understand—and perhaps solve—this discrepancy.

Data could be stored and viewed spatially and connected to hydrologic unit codes (HUCs) to allow searching by watershed. In addition, HUC data can facilitate connection to other data sources such as AW's database or water quality or other data through USGS or the US Environmental Protection Agency.

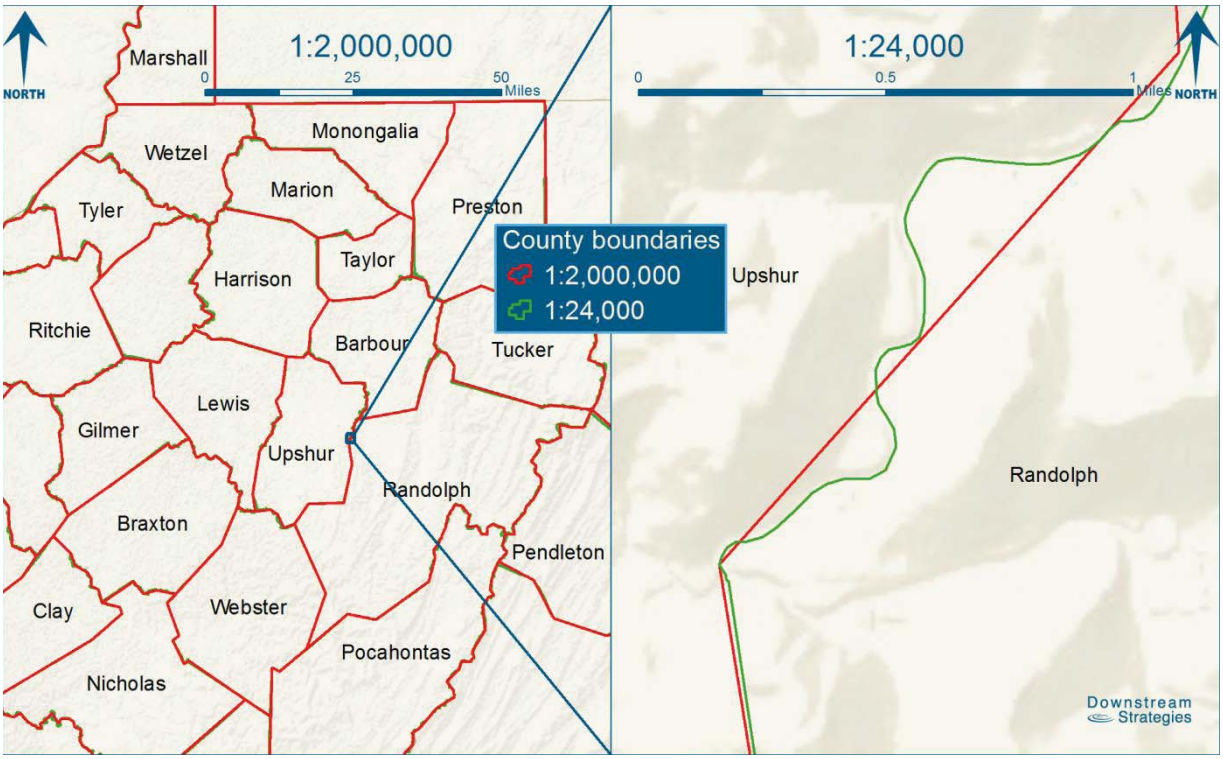
***Update GIS resolution*.** The resolution of the pre-2000 listed segments and associated data could be updated using the NHD as a foundational data source from which to create WSR segments. The GIS WSR segments before 2000 were collected at 1:2M scale, while segments added after 2000 were generally collected at 1:24k scale.

Data collected at lower resolution (1:2M) are less precise than those collected at a higher resolution (1:24k). This is evident when viewing a map at large scale (Figure 3). A 1:2M scale is better for viewing data at a zoomed out perspective: many details of the county boundaries are softened and, when zoomed out, the 1:2M dataset does not appear to be much different from the 1:24k dataset. Conversely, the higher resolution 1:24k dataset allows for enhanced viewing at a zoomed in perspective (e.g., national data zoomed into a state or watershed). Ideally, having the files at both resolutions would allow for various uses.

A higher resolution dataset also allows for increased functionality and accuracy with data analysis such as data queries (see Section 3.2). Additionally, differences in resolution affect measurements of length; 1:24k data will yield more accurate length measurements. The current WSR GIS data are at various scales, which may contribute to the discrepancy in length totals between the GIS data and the PDF listing.

Although the ideal is to ultimately have high resolution data for all sections, there are some drawbacks to the high resolution data that warrant also maintaining the lower resolution data. First, when zoomed out using high resolution data, fuzziness and "noise" occurs in line data such as borders; county borders, for example, appear very thick. Secondly, high resolution data create a larger file size, which may cause problems with some applications or in sharing data.

Figure 3: West Virginia counties at two different resolutions and scales



3.4 Wild and Scenic River data

The interagency WSR data—and associated data dictionary—could benefit from the following updates:

Include geospatial information. Information such as the start and end points or section lines would be useful. Because start and end point GIS coordinates do not exist in the GIS files, these two attributes can be added.

Include additional updates for designated and candidate rivers. Updates can be found in the most current attributes listed in the IWSRCC data dictionary.

4. RECOMMENDATIONS

Based on a data inventory and needs assessment, this plan offers suggestions for data updates and additions. Since rivers cross multiple jurisdictions, NPS is not the only agency considering the best way to collect and provide river data. Comprehensive updates necessitate communication and collaboration between and among river management entities. We offer the following recommendations at both the agency and interagency levels.

4.1 Collaborate with existing partners

RMS, a project facilitator between agencies, organizations, and specialists, is uniquely suited to assist NPS with this analysis and development of a comprehensive yet user-friendly database/map that serves both agency personnel and the public. RMS welcomes and looks forward to seeking partnerships with organizations whose assets complement this project; while RMS is keen to lead the effort, the organization is mindful to build upon existing resources. Organizations with which RMS may combine forces include:

- AW;
- American Rivers;
- National Geographic Society;
- River Network; and
- other federal agencies such as BLM, USFS, and USFWS.

4.2 Update listings and attributes for NRI segments

At the interagency level, listings and attributes for NRI segments should be updated—and new attributes should be considered—as per the data update needs listed in Section 3.2. The primary attributes absent from the NRI files is "management entity" (i.e., USFS, USFWS, NPS, BLM, state) and "management area name." The latter only is populated with NPS park names under the attribute "PARKNAME;" this field is not populated when managed by another agency. It may also be useful to include the attribute "management code" that corresponds with the individual management entity. These attributes may be populated through a GIS analysis, as discussed in Section 3.2. Other potential attributes to add include potential classification and management plan information.

4.3 Improve interagency WSR files

We offer the following recommendations for data updates and additions within the WSR files:

Populate existing attributes within the WSR GIS files. Section 3.3 provides specific recommendations***.*** Populating the known attributes of the existing GIS file would make publicly available information more accessible; the data would then be contained in a spatial dataset, as well as a spreadsheet file, which can be easily imported into a future or existing database. These attributes could include the following: length, agency, and class (i.e., wild, scenic, recreational).

Add and populate attributes to the WSR GIS files. During this update, agencies may want to consider adding and populating attributes not already in the GIS file and associated spreadsheet. Additional attributes can be pulled from the existing IWSRCC WSR attribute data dictionary, such as start and end points; others may also include new length attributes, such as "policy length" and "actual length," as described in Section 3.3.

Improve resolution of GIS data for WSRs. Use the NHD to improve the resolution of GIS data for WSRs. This recommendation is best achieved at a national level with coordination between agencies, including working with USGS as a technical resource. Segments can be created using the NHD higher resolution GIS files with the description of the start and endpoints. NPS has initiated this process at the state level.

Merge GIS and tabular WSR data. Merging data would create a single and comprehensive WSR file with both GIS and attribute information. This would enable future data storage and dissemination in both tabular and geospatial forms, keeping up with technology. To do this, add corresponding GIS coordinates (e.g., beginning and end points) to the narrative beginning and end points. This recommendation is best achieved at a national level with coordination between agencies, including working with USGS as a technical resource.

4.4 Create a GIS dataset of whitewater segments by administrative boundary

At the interagency level, river managers can collaborate with AW using GIS to develop an initial listing of whitewater river sections for each agency by overlaying AW's spatial river data with agency boundaries. Output from this analysis will include management entity affiliation (e.g., BLM, USFS) for each AW-listed whitewater section. This analysis can bolster AW's database because management entity and contact information is not currently known for all AW-listed whitewater sections. The analysis will also offer each agency an initial list of recreational river segments.

Output from this analysis will create an initial list of recreational river segments, which will require at least two rounds of editing. First, because some rivers listed in the AW database may not be managed for boating use, the list will need to be checked and addressed in a manner that meets management needs. Second, because AW lists whitewater sections, non-whitewater segments may need to be added to create a comprehensive list of recreational segments. GIS data may not be available for these additional sections. For NPS only, the agency's "Find a Park" Web site search may assist with editing the output from the analysis.

4.5 Create a GIS dataset of all rivers within each administrative boundary

As of the date of publication of this report, it was unknown if a dataset exists that lists all rivers that flow through NPS administrative boundaries. To generate this dataset for NPS or other agencies, a GIS analysis could be conducted overlaying the NHD with boundaries of parks or other land designations. This analysis could help generate an initial GIS-based list of rivers that flow through administrative boundaries. For this plan, a similar analysis was conducted with NRI and park boundaries datasets, generating a list of all NRI-listed rivers within park boundaries (see Section 3.2).

4.6 Gather existing NPS administrative information (NPS-specific)

NPS can gather information contained in existing sources, such as the NPS Red Book, NPS's "Find a Park" search function, and national park boundaries GIS file. The following data and their relevant attributes can be found in spreadsheet or database formats, or entered manually: park name; region; designation type; individual park Web site; and contact information including phone number, address, state, and zip code. A future database would need this information in spreadsheet or database format.

Additional attributes, such as a Web site hyperlink, would either need to be found in or entered into a spreadsheet or database for future use. NPS's online "Find a Park" search function links users to individual park Web sites. It would be useful for future database efforts to obtain a data export of each park and its associated Web site, as that attribute is not in in many—if any—of the datasets. An updated listing of park Web sites could facilitate updates of existing river data, as well as future research to collect new river data.

The Red Book may be useful in in creating an NPS river database. For example, once the park name is determined for a certain section of river, the corresponding information for that park can be linked via a database. In addition, updates within a park (e.g., phone number changes), can be easily made within a single set of park information data that is linked to the river data; these updates can be made once and separately. The database can then enable "cascading updates" to update any linked reference of that data through a common attribute(s) that acts as a "key." For example, if a future river database contains a park unit code alongside river data, and another database contains the park unit code alongside contact information, the

two databases can be linked via the park unit code. This can help to populate attributes in a future river database that may contain empty attribute fields such as park contact information.

4.7 Collect new data (NPS-specific)

The following data can be collected independently from other data listed in this recommendations section:

- designated WSR attribute fields (such as river name, NPS region, miles);
- candidate WSR attribute fields (beyond what is listed in the NRI);
- existing GIS files for rivers in park boundaries (e.g., recreational access points, WSR beginning and end points);
- management plans, including park, river, or WSR;
- fees/permits for each river and creek within each park;
- associated USGS stream gauge or HUC for each river and creek within each park;
- boatable, floatable rivers in parks; and
- water trails.

This information could be collected using various combinations of methods and staffing, including NPS, RMS, consultants, students, and volunteers. Any future data call should provide a river spreadsheets created at a national scale with as much information populated as possible. NPS contacts may find it easier to edit or populate comprehensive lists that are developed from a national perspective and personalized by state or park.

The NPS GIS Council has been working on standards for creating layers and data dictionaries; this document should be referenced for any future updates to NPS GIS data—or for future database creation. Internal to NPS, this document can be accessed here: http://inpniscsfern1:7000/sites/IR/RIM/Standards%20Repository/GIS%20Standards/Standards%20Process/GIS_Stds_Requirements_20110519.pdf.

4.8 Collaborate with park atlas development efforts (NPS-specific)

The NPS Denver Service Center is creating best management practices for use in an atlas of national parks. In the future, using these practices will be mandatory during park planning efforts. Therefore, future river data collection should reference and adhere to these standards so the data can be integrated into the park atlas. As part of this effort to build a park atlas, NPS may want to collect certain river data such as whitewater rivers/creeks or water trails.

4.9 Collect water trail information

Determine lists, databases, geospatial files, and other types of information necessary to create informative interfaces with the burgeoning population of water trails in the US.

4.10 Collaborate to incrementally create a national river database

Because the management of our nation's rivers is interagency in nature, the management agencies should undertake river data management as a cohesive group. The existing structure and momentum of IWSRCC allows for this type of collaboration; the NPS-led NRI naturally fosters interagency collaboration. Other agencies like the National Oceanographic and Atmospheric Administration and US Army Corps of Engineers may be interested as well. RMS has and will continue to foster communication and collaboration between river management entities on interagency initiatives and can play the role of interagency liaison or facilitator of the river data initiative.

APPENDIX A: NATIONAL BLM RIVER DATABASE GLOSSARY – PUBLIC FIELDS

Attribute name	Definition
State1	Primary State associated with the physical location of the river section. The data is separated by state, and collected in that manner, two capital letters representing state.
State2	Secondary state associated with the physical location of the river section. This field is populated only when the river section crosses state lines. The data is separated by state, and collected in that manner, two capital letters representing state.
Office Name	Complete name of office directly responsible for management of river section. Each office name is connected to office code. Office name signifies office type: “Field Office," National Conservation Area," etc.
River/Creek	Name of river or creek. If a river, the word “River” has been dropped. If a creek, the word “Creek,” is used. If the name of the river is in Spanish, and commonly named with the Spanish word for river, it has been used in this field, e.g., “Rio Grande”. If there is a fork, the river name is first, followed by the fork name, separated by a comma: e.g., “Gunnison, North Fork. If the river/creek is a common name, e.g., Clear Creek, state name first, followed by the associated river in parenthesis, e.g., Clear Creek (Arkansas), Clear Creek (South Platte).
Section Name	Name of the river section. If available, this name could be a commonly-used name for the section, or could be the put-in to the take-out, if there is no name independent of those. The sections are in alphabetical order.
Access Notes	Access Notes that BLM wants to communicate to public.
Management Notes	Management Notes that BLM wants to communicate to public
Put-in	Descriptive name for the physical location of the put-in, described with text (e.g., could be a town, a park, a bridge, etc.)
Take-out	Descriptive name for the physical location of the take-out, described with text (e.g., could be a town, a park, a bridge, etc.)
Section Length	Number of miles from the put-in to the take-out, to the nearest tenth, if available.
Other Access Points	Descriptive name for alternative access points for public use between or just beyond put-in or take-out.
Class/Difficulty	Difficulty as defined by the International Scale of River Difficulty, Class I-IV. Roman numerals I-V are used, either individually, or in a range, separated by a dash, e.g., I-III. Because Class VI is unrunnable, those sections will be excluded in a floatable, boatable database.
Designation	Descriptive name for each type of designation. Designations for special recognition and/or protection can be made Administratively, Congressionally or through the land use planning process and can overlap.
Drainage	Determined though Hydrological Unit Codes (HUC). Not a data field, but is searchable.
Office Number Area Code	A 3-digit number, which represents the area code for the office responsible for the management of the sections of river(s) listed. The area code is separated from the main number, to enable the ability to filter by area code.
Office Number	A 7-digit number, separated only by dashes, which connects you to the office responsible for the management of the sections of river(s) listed.
Office Street Address	This field represents the street/P.O. Box section of the physical address associated with the river section.
Office City	This field represents the city of the office responsible for the management of the sections of river(s) listed.
Office State	This field represents the state of the office responsible for the management of the sections of river(s) listed. The state is listed by postal standard, two capital letters abbreviating the state.
Office Zip Code	This field represents the zip code of the office responsible for the management of the sections of river(s) listed. The zip code is a

	5-diget number.
Office website	web link to BLM office that deals with river section(s). Link to rivers page if they have one, if not the recreation page, where available. If neither pages are available, the field office page link should be used.
Other Office Agency Name	When applicable, the name of the non-BLM agency that deals with management of river section.
Other Office Name	When applicable, the name of the office of the non-BLM agency that deals with management of river section.
Other Office Address	When applicable, the address of the office of the non-BLM agency that deals with management of river section.
Other Office City	When applicable, the city of the office of the non-BLM agency that deals with management of river section.
Other Office State	When applicable, the state of the office of the non-BLM agency that deals with management of river section.
Other Office Zip Code	When applicable, the zip code of the office of the non-BLM agency that deals with management of river section.
Other Office Area Code	When applicable, the 3-diget area code of the phone number of the office of the non-BLM agency that deals with management of river section.
Other Office Phone Number	When applicable, the phone number of the office of the non-BLM agency that deals with management of river section.
Other Office website	When applicable, the website of the office of the non-BLM agency that deals with management of river section. Link to rivers page if they have one, if not the recreation page, where available. If neither pages are available, the office page link should be used.
Online Gauge	URL for the most relevant USGS online gauge that shows "Real Time" data for this section.
Permit	Permits, or Special Recreation Permits, are authorizations which allow for recreational use of the public lands and related waters. They are issued as a means to control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors.
Permit Type	Type of Special Recreation Permit (private permit) needed for private boating publics to run river. Types include the following: None, 1st come/1st serve, lottery, mail in, self-issue, other.
Permit site	Link to website that specifically explains permit system.
DESIGNATIONS	
Wild and Scenic River (WSR)	Wild and Scenic Rivers are designated under the authority of the Wild and Scenic Rivers Act of 1968 to protect outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values and to preserve the river in its free-flowing condition. There are three classes of protected rivers: Wild, Scenic, and Recreational. The BLM is responsible for portions of 38 WSRs for a combined total of over 2,000 miles.
Wilderness Area (WA)	Wilderness areas are those special places where the earth and its community of life are essentially undisturbed; they retain a primeval character, without permanent improvements and generally appear to have been affected primarily by the forces of nature. In 1964, Congress established the National Wilderness Preservation System and designated the first Wilderness Areas in passing the Wilderness Act. The uniquely American idea of wilderness has become an increasingly significant tool to ensure long-term protection of natural landscapes. The BLM is responsible for 175 Wilderness Areas with 7.2 million acres in 10 Western States.
National Conservation Area (NCA)	National Conservation Areas (NCAs) are designated by Congress to conserve, protect, enhance, and manage public land areas for the benefit and enjoyment of present and future generations. NCAs feature exceptional natural, recreational, cultural, wildlife, aquatic, archeological, paleontological, historical, educational or scientific resources.

National Monument (NM)	Although the first BLM national monument was created as recently as 1996, this conservation designation is now an integral part of the agency's multiple-use mandate. Congress granted the President authority to designate national monuments in the Antiquities Act of 1906, which specifies that the law's purpose is to protect "objects of historic or scientific interest." In addition to presidentially created national monuments, Congress has established national monuments by passing a law to create each individual monument with its own purpose (generally to protect natural or historic The BLM administers fifteen national monuments in eight western states.
Cooperative Management Protection Area (CMPA)	The Cooperative Management and Protection Area designation was established by Congress to conserve, protect, and manage the long-term ecological integrity of special landscapes for future and present generations. This designation seeks to maintain and enhance cooperative and innovative management projects, programs and agreements between tribal, public and private interests. In addition, the area is managed to ensure the conservation, protection, and improved management of ecological, social and economic resources.
Area of Critical Environmental Concern (ACEC)	The designation of Areas of Critical Environmental Concern (ACEC) is authorized in Section 202 (c)(3) of the Federal Land Policy and Management Act of 1976 (FLPMA, P.L. 94-579). ACECs include public lands where special management attention and direction is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ACEC designation indicates BLM recognizes the significant values of the area and intends to implement management to protect and enhance the resource values.
Special Recreation Management Area (SRMA)	"A public lands unit identified in BLM land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific structured recreation opportunities."
National Petroleum Reserve (NPR)	In 1923, President Harding established the Naval Petroleum Reserve Number 4. This area, approximately 37,000 square miles at the northern-most portion of Alaska, has been explored and mapped by the USGS since 1901. The U.S. Navy undertook the first modern oil-exploration program between 1944-1958, In 1976, the petroleum reserve was renamed the National Petroleum Reserve, Alaska, (NPRA) with the USGS given the lead responsibility for further research and exploration until 1982.
National Recreation Area (NRA)	Congress established the National Recreation Area designation primarily to protect important recreation, scenic, scientific, and natural values for the enjoyment of current and future generations. Recreation activities center on water - and land - based activities associated with the natural environment. The BLM's first and only National Recreation Area was established by law in 1980 in Alaska.
State-designated Wild and Scenic River (State WSR)	State-designated Wild and Scenic River.
FEDERAL AGENCIES	
BLM	Bureau of Land Management, United States Department of the Interior
NPS	National Park Service, United States Department of the Interior
FWS	Fish and Wildlife Service, United States Department of the Interior
USFS	United States Forest Service, United States Department of Agriculture

Note: Public fields are those displayed on the publicly-available database Website. Not all attributes are currently populated within database.

APPENDIX B: NATIONAL BLM RIVER DATABASE GLOSSARY – PRIVATE FIELDS

Attribute name	Definition
Management Level	Number associated with the level of BLM management on a section of river. Levels 0,1, and 2 loosely group the river sections by the degree to which it is managed for boating use: from active management for recreational boating (ML 2), to management investments for other purposes (hiking, fisheries) without active management for boating (ML 1), to limited or no management/attention in general (ML 0).
Management Level 0	*None to Limited management*– BLM lands are adjacent to the listed river/creek, but there is no active "management," i.e., these sections are boatable, but due to remoteness, lack of emphasis or management resources to manage, it is not managed.
Management Level 1	*Limited management* – The potential floatable/boatable opportunity exists, yet this is not the primary management focus. There is not a comprehensive river management plan, nor are there any active projects via the Budget Planning System (BPS) or Facilities Asset Management System (FAMS) related to boating use. The river corridor is managed by BLM for purposes other than boating, e.g., water quality, wildlife and/or fisheries projects, stream bank restoration, mining rehabilitation, or interpretation and/or education. In these cases, river sections are encumbered with access, acquisition, withdrawal, or safety issues awaiting resolution, i.e., these sections might run infrequently, perhaps due to flash floods. It might also be a difficult stretch (Class V-V+), where liability may be a concern in publicizing it. This stretch is one that people boat, but is not managed for boating at this time. It has potential for more management in the future.
Management Level 2	*Partial to High management* – Encompasses a grouping or spectrum of management practices. Sections are included if they meet one, some, or all of the following management practices: • BLM-managed facilities serve the boating public .The facilities may include key access point(s) with BPS and/or FAMS facilities, e.g., boat ramps, parking lots, toilets, water, signs, camping facilities, contact stations, and kiosks. • Administrative or Congressional Designation - May/may not have a notice of reality action, Federal Register notice or withdrawn from mining, mineral leasing, or the public land laws. • Initiation or completion of a Comprehensive Management Plan (CMP) or project plan to manage the river for boating use. Funding projects related to boating (can be quantified through the BPS) exist here. • Publication or advertisement of BLM-management, e.g., websites, brochures, and/or Federal Register notices specific to the section of river. • Agency On-Site Presence, e.g., scheduled patrols, enforcement, or other types of regulated use indicate this level of management. Use Restrictions in place, e.g., boating access is controlled and allocated through permits for commercial and/or private boating use, i.e., these sections are used for boating, ranging from sections that are well-known to lesser known. They could be stretches that are jointly managed (state, other federal agency, or tribe), as long as BLM has a role, as described above, in management.
BLM notes	Additional notes for BLM view only. This field can potentially be linked to "access issues" below to avoid data overlap and promote consistent data entry. (i.e.: private access, access issues, fatalities)
BLM miles	If available and different than "section length," number of miles managed by the BLM in applicable section, from the put-in to the take-out, to the nearest tenth.
HUC Code	Relevant USGS HUC codes that link the river section to its drainage. Where there are two HUC codes within the section, enter uppermost HUC.

Put-in Lat	Latitude for the physical location of the put-in.
Put-in Lon	Longitude for the physical location of the put-in.
Take-out Lat	Latitude for the physical location of the take-out.
Take-out Lon	Longitude for the physical location of the take-out.
Candidate WSR ID	Unique ID for future link with Candidate Wild and Scenic River (WSR) database
Designated WSR ID	Unique ID for future link with Designated Wild and Scenic River (WSR) database.
RMIS ID	Not a field for data entry form. Unique ID to link with data from BLM's RMIS. This will provide visitor use data. ID connected to both rivers and river sections
Litigation Case Name/Date	Case name and date of litigation. Include any other relevant information. Field is searchable by if text exists and/or by key word. Upload relevant document(s) where possible.
RMP Name/Date	Resource Management Plan(s) that relate to river/river section. River section may be included in multiple RMPs when the river crosses states or office or state boundaries. Field is searchable by if text exists and/or by key word. Upload relevant document(s) where possible.
CRMP Name/Date	A Comprehensive River Management Plan, or Activity-Level Plan, is a more river-specific plan that is not always available. They should exist when river is a designated Wild and Scenic River. When available, these plans address visitor capacity and allocation. One plan could address multiple sections of the same river (different sections, as well as forks of the same river). Field is searchable by if text exists and/or by key word. Upload relevant document(s) where possible.
Access Issues	Are there private property or other issues that limit user access to this river/creek section? This field is searchable.
Access Comments	If "Y" is chosen in "Access Issues" field, describe access issue.
River Contact	The employee name at the office responsible for the management of the physical sections of river(s) listed.
Contact's Number Area Code	A 3-digit number, which represents the area code for the contact responsible for the management of the sections of river(s) listed. The area code is separated from the main number, to enable the ability to filter by area code.
Contact's Direct Number	A 7-digit number, separated only by dashes, which connects you to the office responsible for the management of the sections of river(s) listed. Both office and contact numbers are useful, because the river contact, therefore contact's number, may change often. The main office number provides a backup contact.

Note: Private fields are those displayed on Web site database via login. Not all attributes are currently populated within database.