



PACIFIC SOUTHWEST REGION INVENTORY & MONITORING INITIATIVE


Annual Work Plan FY 2014

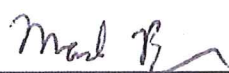


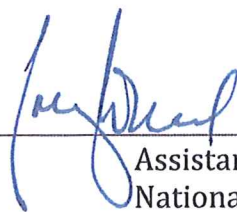
The Pacific Southwest Region Inventory and Monitoring initiative identifies important natural resources on National Wildlife Refuge System lands and provides information to support and evaluate management of these resources under the influence of climate change and other environmental threats.



*FY 2014 Pacific Southwest Region Inventory & Monitoring Initiative
Annual Work Plan Approvals*

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Pacific Southwest Region I&M FY 2014 Annual Plan

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Introduction

The Pacific Southwest Region Inventory and Monitoring initiative (I&M) identifies important natural resources on National Wildlife Refuge System (NWRS) lands and provides information to support management of these resources under the influence of climate change and other environmental threats. I&M is part of the NWRS regional biological program and cooperates with the Landscape Conservation Cooperatives (LCCs) initiatives. Our basic philosophy is that inventory and monitoring information should support management decision-making at multiple spatial scales. The regional program originally stepped down from the national 2010 documents *Strategic Plan for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change* and *Operational Blueprint for Inventory and Monitoring on National Wildlife Refuges: Adapting to Environmental Change*. This plan is aligned with the national I&M initiative through the *Inventory and Monitoring 7-Year Plan: 2013-2020 For the National Wildlife Refuge System* approved by NWRS in April 2013 (see Appendix 1 for a crosswalk from our objectives to 7 Year Plan topics).

National Wildlife Refuges and Wildlife Management Areas are the focus of the I&M initiative. We support Pacific Southwest Region field stations (Figure 1) by identifying priority conservation and management issues and tracking the status and trends of biotic and abiotic factors needed to effectively manage refuge lands and waters. We provide technical guidance and expertise to stations to develop planning documents, monitoring protocols, databases, and data analysis strategies so that information is available and accessible to make the best management decisions. We support refuges to document the status of, and detect changes in their diverse biotic communities and physical resources, (including water, air and soils). We use this information to support science-based conservation planning and management at all spatial scales. We help identify landscape level priorities for monitoring on refuges by coordinating with internal and external partners, particularly LCCs, to raise the quality of science and resource management across the landscape.

This document outlines priorities for the Pacific Southwest Region I&M initiative for the Fiscal Year (FY) 2014 (October 2013 through September 2014). We present three long-term goals, established in 2013, that address high priority needs of refuges across the region:

- ❖ accessing information for effective decision-making
- ❖ assessing and managing threats to target resources
- ❖ strategic planning and partnering to meet priority refuge needs

The plan identifies seven major I&M thematic areas grouped under the three long-term goals, with 15 specific objectives to be achieved by October 2014, unless otherwise noted. For each objective, essential “key actions” are listed.

Figure 1. National Wildlife Refuges and Wildlife Management Areas Served by the Pacific Southwest Region I&M Initiative (Approved Acquisition Boundaries)



The Planning Process

- Definitions:
 - **Goal:** long term vision
 - **Thematic areas:** groupings of objectives on topics of foundational importance to I&M
 - **Objective:** what success looks like; the outcome desired
 - **key action:** task someone needs to do to achieve the outcome
- Long term goals and thematic areas were identified in our FY 2013 planning process. For FY 2014, the goals remain the same as in FY 2013. Thematic areas are the same, except that the Bird Monitoring thematic area was removed because projects under that thematic area fit equally well elsewhere.
- We reviewed the FY 2013 objectives by considering the national I&M strategic planning documents listed above, the FY 2013 Pacific Southwest Region Needs Assessment (Needs Assessment) and regional projects ongoing in FY 2013. The team then evaluated the objectives by consensus based on **importance and impact** for resources and refuges and on **feasibility**. The result of this process was that most objectives remain the same as in FY 2014. Feasibility was further examined by projecting staff time and resources required to implement, including interdependencies within the team and with partners.
- We clarified objectives using the **SMART** criteria (specific, measurable, achievable, relevant, and time-bound). All key actions were further tested and strengthened to ensure that every action in the plan is **essential** and together **sufficient** for achieving the objectives.
- A lead person (or persons) was identified for each thematic area and key action (see Table 1 for staff name abbreviations).

Pacific Southwest Region Inventory & Monitoring Long-Term Goals

- ❖ Goal 1 *Accessing Information for Effective Decision Making:* Refuges and their partners have **easy access to priority refuge natural resource data** to support effective analysis and decisions, meet legal requirements, protect NWRS investment in data collection, and provide continuity when staff changes.
- ❖ Goal 2 *Assessing and Managing Threats to Target Resources:* Refuges and their partners have the **information, resources and technical guidance needed to assess and manage the impact of key threats** or stressors on their target species and ecosystems at the local and landscape scales, starting with invasive species, water resources and climate change.
- ❖ Goal 3 *Strategic Planning and Partnering To Meet Priority Refuge Needs:* The Pacific Southwest Region I&M team demonstrates the **effective use of strategic planning and partnerships to meet priority refuge needs** and leverage the impact of our services and products.

FY 2014 Objectives (Obj)

GOAL 1: Accessing Information for Effective Decision-making

Thematic Area: Informatics

- Obj 1.1 **Capture documents that are currently in refuges files and provide access through the Service Catalog (ServCat).** Prioritize collection of documents that support management decisions, baseline inventories, monitoring and research.
- Obj 1.2 Use the PRIMR database and other standardized data systems to **document inventory and monitoring surveys** currently conducted on Region 8 refuges to understand refuge needs and determine how refuge surveys can contribute to landscape scale conservation.
- Obj 1.3 Provide NWR staff with **easy access to defensible species lists** generated from existing refuge data to support refuge management and I&M plan development.
- Obj 1.4 Provide GIS support to develop **functional GIS libraries and methods for long-term maintenance of spatial data.**
- Obj 1.5 Provide biostatistical support to refuges for **analysis of high priority natural resource datasets.**
- Obj 1.6 Support NWR staff in developing or adopting **scientifically defensible survey methods and protocols for priority natural resource surveys on refuges.** Survey protocols will be consistent with the national Survey Protocol Handbook.

GOAL 2: Assessing and Managing Threats to Target Resources

Thematic Area: Invasive Species

- Obj 2.1 By the end of FY 2015 **develop a framework to support strategic and adaptive invasive plant management on refuge lands.** The framework will include 1) planning/data flow diagrams; 2) an updated weed management plan (IPM) template; 3) data collection and management systems; 4) framework protocols for inventory; and 5) tools to support prioritization of species, inventory targets and treatment actions.

Thematic Area: Refuge Water Resources

- Obj 2.2 Conduct Water Resources Inventories and Assessments (WRIAs): **Complete two WRIA reports** at stations identified in FY 2012 that can be used by refuge staff to make water management decisions; **complete selected components of WRIA inventories for all refuges;** and **implement three high priority recommendations** from completed WRIA reports .
- Obj 2.3 **Improve access to water rights information** for refuges to improve monitoring and reporting compliance.

Thematic Area: Climate Change

Obj 2.4 Assess the vulnerability of refuge natural resources to climate change and use this information to ***develop specific climate adaptation strategies*** for at least 7 refuges by the end of FY 2015. Completion of adaptation strategies is dependent upon funding.

GOAL 3: Strategic Planning and Partnering To Meet Priority Refuge Needs

Thematic Area: Natural Resource Management Plans (NRMPs, formerly HMPs) And Inventory & Monitoring Plans (IMPs)

Obj 3.1 Develop a ***streamlined (< 9 month) process for creating concise, user-friendly NRMPs and IMPs*** that will help refuge staff improve decision-making about managing natural resources of concern.

Thematic Area: I&M Planning and Partnerships

Obj 3.2 Use the Needs Assessment to ***inform I&M Program Planning (annual, 5-year) and to advocate for meeting Region 8 refuge needs.***

Obj 3.3 Ensure that all Pacific Southwest Region I&M program services and products ***reflect the natural resource priorities of refuges*** and address strategic input from key partners and stakeholders.

Obj 3.4 ***Collaborate with research, monitoring and conservation management partners to meet shared goals.***

FY 2014 Key Actions

GOAL 1: Accessing Information for Effective Decision-Making

Thematic Area: Informatics [Lead: Kaylene Keller]

Objective 1.1 *Capture documents that are currently in refuge files and provide access through ServCat. Prioritize collection of documents that support management decisions, baseline inventories, monitoring and research.*

Key Actions

1. Capture and submit to ServCat high priority documents from two refuge complexes. (KK, University of California, Davis Cooperative Ecosystems Studies Unit (UC Davis CESU))
2. Submit final I&M-created documents to ServCat: Anaho Island NRMP/IMP, completed WRIA reports, Ruby Lake Vegetation Map. (KK)

Objective 1.2 *Use the PRIMR database and other standardized data systems to document inventory and monitoring surveys currently conducted on Region 8 refuges to understand refuge needs and determine how refuge surveys can contribute to landscape scale conservation.*

Key Actions

1. Evaluate gaps in coordinated bird monitoring on refuges, develop criteria to rank monitoring needs, and use the criteria to identify 1-2 high-priority bird monitoring pilot projects. (OR)

Objective 1.3 *Provide NWR staff with easy access to defensible species lists generated from existing refuge data to support refuge management and I&M plan development. .*

Key Actions

1. Continue to develop documented bird species lists for refuges based on easily accessible 2012 bird lists. (KK, UC Davis CESU)
2. Using species data from Avian Knowledge Network (AKN) and USGS BISON, evaluate the potential of using existing species observation systems to develop documented birds species inventories. (KK, UC Davis CESU)
3. Co-lead a national I&M team to develop the Species Information System. (KK, OR)
4. Complete a survey of reptiles and small mammals at Desert NWR by the end of FY15. (OR, California Academy of Sciences)

Objective 1.4 *Provide GIS support to develop functional GIS libraries and methods for long-term maintenance of spatial data.*

Key Actions

1. Continue to work with current Data Club refuges to create functional GIS libraries. (EB, KK)
2. Develop draft report on the methods and results from vegetation mapping at Ruby Lake. (KK, Justin Epting (Regional Division of Planning), University of Nevada Reno CESU)

3. Develop a draft vegetation map for Stillwater NWR. (KK, EB, JE, University of Nevada Reno CESU)

Objective 1.5 *Provide biostatistical support to refuges for analysis of high priority natural resource datasets.*

Key Actions

1. Shepherd existing biostatistics projects. (KK, GB, OR, UC Davis CESU)

Objective 1.6 *Support NWR staff in developing or adopting scientifically defensible survey methods and protocols for priority natural resource surveys on refuges. Survey protocols will be consistent with the national Survey Protocol Handbook.*

Key Actions

1. Complete the analysis of marsh bird pilot project data from 2012-13, determine if additional surveys are needed, and carry them out. The marsh bird pilot project is aimed at standardizing refuge marsh bird survey methods based on the National Marsh Bird Monitoring Protocol. (Point Blue Conservation Science, OR)
2. Complete three pilot projects to evaluate the feasibility of using unmanned aircraft systems (UAS) for conducting waterbird surveys. Apply for outside funding to support a Masters project to process the imagery using online crowdsourcing. (OR, SD, USGS)
3. Participate in regional efforts to improve the design of the Midwinter Waterfowl Survey. (OR, Central Valley Joint Venture, San Francisco Bay Joint Venture, U.S. Fish and Wildlife Service (USFWS) Division of Migratory Birds)

GOAL 2: Assessing and Managing Threats to Target Resources

Thematic Area: Invasive Species [Lead: Giselle Block]

Objective 2.1 *By the end of FY 2015 develop a framework to support strategic and adaptive invasive plant management on refuge lands. The framework will include 1) planning/data flow diagrams; 2) an updated weed management plan (IPM) template; 3) data collection and management systems; 4) framework protocols for inventory; and 5) tools to support prioritization of species, inventory targets and treatment actions.*

Key Actions

1. Develop a conceptual model showing the core elements and phases of planning and implementing invasive plant management. (GB)
2. Complete development of a desktop tool to prioritize invasive plant threats for inventory and ultimately management. One to two refuges use the tool to prioritize invasive plant threats for inventory and management. (GB, Utah State University CESU)

3. Develop a web-based spatial tool (WHIPPET) to prioritize invasive plant treatment actions at a local refuge scale (using spatial inventory data). One to two refuges use the tool in FY 2014. (GB, California Invasive Plant Council)
4. Collaborate with the National I&M Invasive Species Working Group to develop framework protocols for invasive plant inventories and early detection monitoring by the end of FY 2015. (GB)
5. Complete and publish a paper demonstrating use of refuge inventory and monitoring data to support effective management of invasive plants. (GB, Utah State University CESU)
6. Complete invasive plant inventory protocols for Ruby Lake and San Pablo Bay NWRs and ensure they meet National I&M protocol standards. (GB, Utah State University CESU, Shelterbelt Builders)
7. Complete invasive plant inventory reports for Ruby Lake and San Pablo Bay NWRs. (GB, Utah State University CESU)

Thematic Area: Refuge Water Resources [Lead: Rachel Esralew]

Objective 2.2 *Conduct Water Resources Inventories and Assessments (WRIAs).*

Key Actions

1. Complete WRIA reports for Pixley and Ellicott Slough NWRs (identified as pilot WRIAs), and the inventory for Humboldt Bay NWRC to support its NRMP/IMP development. (RE, SM)
2. Complete selected components of WRIA inventories for all refuges. (RE, SM)
3. Implement three high priority recommendations from completed WRIA reports. (RE)
4. Start to determine a “region of hydrologic influence” for Central Valley refuges using the CALVIN Water Management Model (RE, UC Davis Watershed Center CESU)

Objective 2.3 *Improve access to water rights information for refuges to improve monitoring and reporting compliance.*

Key Actions

1. Complete an inventory of water rights information for Stone Lakes, Sacramento, and San Joaquin NWRs (refuges selected in the pilot project in FY2012). (RE)
2. Complete a water rights information needs assessment for all refuges in Region 8. (RE, contractor Westwater)

Thematic Area: Climate Change [Co-Leads: Giselle Block and Rachel Esralew]

Objective 2.4 *Assess the vulnerability of refuge natural resources to climate change and use this information to develop specific climate adaptation strategies for at least 7 refuges by the end of FY 2015. Completion of adaptation strategies is dependent upon funding*

Key Actions

1. Complete sea level rise response models for four coastal tidal marsh refuges. (GB, USGS)
2. Develop climate adaptation strategies for two coastal tidal marsh refuges by the end of FY 2015. (GB, USGS, San Francisco Bay Joint Venture, Point Blue Conservation Science)

3. Complete draft report for Ruby Lake NWR Climate Change Vulnerability Assessment, based on needs expressed in the 2013 WRIA. (RE, USGS California Water Science Center, UC Davis Information Center for the Environment CESU)

GOAL 3: Strategic Planning and Partnering To Meet Priority Refuge Needs

Thematic Area: Natural Resource Management Plans (NRMPs, formerly Habitat Management Plans, HMPs) And Inventory & Monitoring Plans (IMPs)

[Co-Leads: Giselle Block, Orien Richmond]

Objective 3.1 *Develop a streamlined (< 9 month) process for creating concise, user-friendly NRMPs and IMPs that will help refuge staff improve decision-making about managing natural resources of concern.*

Key Actions

1. Finalize ROC process guide and supporting tools/databases. (OR, KK)
2. Develop NRMP/IMP process guide. (GB, OR)
3. Develop NRMP report template. (GB)
4. Complete Anaho NRMP. (GB)
5. Complete Anaho IMP. (OR, GB)
6. Identify and begin to test methods for tracking NRMP implementation progress and inform annual work plans. (OR, GB)
7. Prioritize refuges to conduct NRMP/IMPs that are supported by WRIAs, legacy data and invasives information. (KL)
8. Test coaching options for NRMP/IMP development: Bitter Creek, Kern and Ruby Lake NWR staff will take the lead completing NRMP/IMP steps, with guidance and support from I&M. Complete threat assessment coaching for Antioch Dunes NWR. (GB, OR)

Thematic Area: I&M Planning and Partnerships: [Lead: Karen Laing]

Objective 3.2 *Use the Needs Assessment to inform I&M Program Planning (annual, 5 year) and advocate for meeting refuge needs.*

Key Actions

1. Use the Needs Assessment results to develop and prioritize Region 8 I&M Program objectives and activities. (KL)

Objective 3.3 *Ensure that all Pacific Southwest Region I&M program services and products reflect the natural resource priorities of refuges and address strategic input from key partners and stakeholders.*

Key Actions

1. Complete FY 2013 annual report and FY 2014 annual plan, drawing on the Needs Assessment and regular communication with refuge staff; incorporate annual plan objectives and activities into performance plans and performance reviews of all staff members; use the plans to establish clear priorities and adapt to the unexpected. (KL)
2. Communicate with Refuges: Produce quarterly newsletter; attend at least one NWRS project leader meeting; provide I&M annual work plans and reports to receive feedback and share lessons learned; attend Refuge Biologists conference calls; interact with Biological Advisory Council. (KL)
3. Complete a 5-year strategic plan for Pacific Southwest Region I&M based on input from refuges and partners, and begin to implement it. (KL)

Objective 3.4 *Collaborate with research, monitoring and conservation management partners to meet shared goals.*

Key Actions

1. Participate in the regular meetings of the National I&M Coordination Team and related working groups to ensure that the national I&M initiative incorporates the Pacific Southwest Region I&M priorities, needs and lessons learned into national priorities and activities. KL
2. Contribute to the implementation and revision of the national 7 year strategic plan for the I&M initiative. (KL, all)
3. At least 3 staff members will participate in at least one national or multi-regional team or project related to regional or national I&M goals. (KK, GB, OR, RE)
4. At least one staff member will participate on an LCC committee or Landscape Conservation Design (LCD) project to communicate refuge conservation needs and identify opportunities to integrate refuge needs into larger landscape conservation projects. (KL, GB)
5. Meet regularly and coordinate with Joint Venture and Migratory Bird partners; participate on JV working groups. (OR)
6. Provide decision making tools and facilitation expertise to the Regional Office. (OR)

Table 1: Pacific Southwest Region Inventory & Monitoring Team

<u>Regional Natural Resources Staff</u>	
Carol Damberg/Mark Pelz	Chief, Natural Resources Division
Sallie Hejl (SH)	Regional Refuge Biologist
<u>I&M Staff</u>	
Giselle Block (GB)	Regional Biologist
Erin Boyle (EB)	GIS Specialist
Sharon Dulava (SD)	Biological Technician
Rachel Esralew (RE)	Regional Hydrologist
Rita Howard (RH)	Administrative Support
Kaylene Keller (KK)	Regional Data Manager, Ecologist
Karen Laing (KL)	Regional I&M Coordinator
Kelsey McDonald (KM)	Pathways Student
Sarah Michehl (SM)	Hydrologist
Orien Richmond (OR)	Regional Biologist

Table 2: Projected FY 2014 Budget for the Pacific Southwest Region I&M Initiative

Projected FY 2014 Budget	
Salaries	\$986,000
Personnel costs	\$42,500
Fixed Costs & Assessments	\$185,500
Contracts/Agreements/Field	\$440,000
Supplies/Equipment/Vehicles	\$37,500
Total	\$1,691,500

Table 3: Partners of the Pacific Southwest Region I&M Initiative

Partner	Representative
California Academy of Sciences	Jack Dumbacher, Curator and Department Chair, Department of Ornithology and Mammalogy
California Department of Fish and Wildlife	Sarah Estrella, Associate Wildlife Biologist
California Invasive Plant Council	Doug Johnson, Executive Director
Central Valley Joint Venture	Robert Shaffer, Coordinator
Ducks Unlimited	Dotti Dean-McMaster, Project Coordinator
East Bay Regional Parks District	Doug Bell, Wildlife Program Manager
Eco Adapt	Laura Hansen, Executive Director
Point Blue Conservation Science (formerly PRBO)	Leo Salas, Senior Scientist; Julian Wood, Wildlife Biologist
San Francisco Bay Bird Observatory	Catherine Burns, Executive Director
San Francisco Bay Joint Venture	Beth Huning, Coordinator
San Francisco Estuary Invasive Spartina Project, California Coastal Conservancy	Peggy Olofson, Director
University of California, Davis and University of California, Merced	Emilio Laca, Professor ; James Quinn, Professor; Joshua Viers, Associate Director, Center for Watershed Science/Director, University of California, Merced Center for Information Technology Research in the Interest of Society
University of Nevada, Reno	Elizabeth Ledger, Professor; Wendy Trowbridge, Researcher
U.S. Forest Service	David Bakke, Regional Coordinator (Forest Health, Pesticide Management and Coordination)
U.S. Geological Survey, Western Ecological Research Center	Dr. John Takekawa, Supervisory Research Wildlife Biologist
USFWS Natl I&M Invasive Plant Working Group	Regional I&M staff, invasive species coordinators
USFWS National Invasives Program	John Klavitter, Coordinator
WestWater Research, LLC	Clay Landry, Managing Director
Utah State University	Dr Corey Ransom, Professor of Weed Science

Table 4: Advisors and Partners Consulted in Planning Process

Carol Damberg (FY13) and Mark Pelz (FY14), Chief, Natural Resources Division
Sallie Hejl, Regional Refuge Biologist
National Wildlife Refuges via the Needs Assessment
National I&M Coordination Team via concurrent national planning process
Pacific Southwest Region Refuges Biological Advisory Council
Audrey Newman, Planning Facilitator

Table 5: Acronyms

AKN		Avian Knowledge Network
BAC		Biological Advisory Council for the Pacific Southwest Region refuges
BCM		Basin Characterization Model (a model to predict water availability)
BISON		Biodiversity Information Serving Our Nation (a USGS database)
CALVIN		An economic-engineering optimization model for the entire water system of California.
CESU		Cooperative Ecosystems Studies Unit
GIS		Geographic Information System
GPS		Global Positioning System
FY		Fiscal Year
HMP		Habitat Management Plan
IMP		Inventory and Monitoring Plan
I&M		Inventory and Monitoring initiative of the U.S. Fish and Wildlife Service
LCC		Landscape Conservation Cooperative
NRMP		Natural Resources Management Plan
NRPC		Natural Resources Program Center (the national home of I&M in Ft. Collins, Colorado)
NWR		National Wildlife Refuge
NWRS		National Wildlife Refuge System
PRIMR		Planning and Review of Inventory and Monitoring on Refuges (a database to catalog surveys conducted by refuges)
RLGIS		Refuge Land Geographic Information System
ServCat		Service Catalog (an online system to store and access documents)
UAS		Unmanned aircraft system
USFWS		United States Fish and Wildlife Service
USGS		United States Geological Survey
WHIPPET		a spatial tool to strategically allocate limited resources for invasive plant treatment
WRIA		Water Resources Inventories and Assessment

Appendix 1: Pacific Southwest Region I&M FY 2014 Objectives Crosswalked with Topics from the *Inventory and Monitoring 7-Year Plan: 2013-2020 For the National Wildlife Refuge System*

National 7 Year Plan Topics in Priority Order (Italicized topics are addressed in the Pacific Southwest Region I&M FY 2014 Annual Work Plan).

I&M Planning (IMPI)

Water Resources Inventory and Monitoring (WRIM)

Data Management (DM)

Systems Development (SM)

Invasive Species Inventory and Monitoring (ISIM)

Endangered Species Act Reporting (ESAR)

Vegetation Mapping (VM)

Abiotic Data (AD)

Bird Inventory and Monitoring (BIM)

Baseline Biotic Inventories (BBI)

Phenological Monitoring (PM)

Adaptive Management (AM)

Wilderness Character Monitoring (WCM)

Surrogate Species Monitoring (SSM)

Fire Monitoring (FM)

Coastal Marine Systems (CMS)

Refuge Condition Assessments (RCA)

Wildlife Health (WH)

Air Quality Biomonitoring (AQB)

Pacific Southwest Region I&M FY 2014 Objectives (Corresponding 7 Year Plan topics listed in Red)

GOAL 1: Accessing Information for Effective Decision-making

Thematic Area: Informatics

Obj 1.1 ***Capture documents that are currently in refuges files and provide access through the Service Catalog (ServCat).*** Prioritize collection of documents that support management decisions, baseline inventories, monitoring and research.

(Data Management (DM))

Obj 1.2 Use the PRIMR database and other standardized data systems to ***document inventory and monitoring surveys*** currently conducted on Region 8 refuges to understand refuge needs and determine how refuge surveys can contribute to landscape scale conservation.

(Data Management (DM), Baseline Biotic Inventories (BBI))

Obj 1.3 Provide NWR staff with ***easy access to defensible species lists*** generated from existing refuge data to support refuge management and I&M plan development.

(Data Management (DM), Systems Development (SD), Bird Inventory and Monitoring (BIM), Baseline Biotic Inventories (BBI), Surrogate Species Monitoring (SSM))

Obj 1.4 Provide GIS support to develop **functional GIS libraries and methods for long-term maintenance of spatial data.**

(Data Management (DM))

Obj 1.5 Provide biostatistical support to refuges for **analysis of high priority natural resource datasets.**

(Invasive Species Inventory and Monitoring (ISIM), Endangered Species Act Reporting (ESAR), Bird Inventory and Monitoring (BIM))

Obj 1.6 Support NWR staff in developing or adopting **scientifically defensible survey methods and protocols for priority natural resource surveys on refuges.** Survey protocols will be consistent with the national Survey Protocol Handbook.

(Invasive Species Inventory and Monitoring (ISIM), Endangered Species Act Reporting (ESAR), Vegetation Mapping (VM), Bird Inventory and Monitoring (BIM), Surrogate Species Monitoring (SSM))

GOAL 2: Assessing and Managing Threats to Target Resources

Thematic Area: Invasive Species

Obj 2.1 By the end of FY 2015 **develop a framework to support strategic and adaptive invasive plant management on refuge lands.** The framework will include 1) planning/data flow diagrams; 2) a weed management plan (IPM) template; 3) data collection and management systems; 4) framework protocols for inventory; and 5) tools to support prioritization of species, inventory targets and treatment actions.

(Invasive Species Inventory and Monitoring (ISIM), Vegetation Mapping (VM))

Thematic Area: Refuge Water Resources

Obj 2.2 Conduct Water Resources Inventories and Assessments (WRIAs): **Complete two WRIA reports** at stations identified in FY 2012 that can be used by refuge staff to make water management decisions; **complete selected components of WRIA inventories for all refuges;** and **implement three high priority recommendations** from completed WRIA reports .

(Water Resources Inventory and Monitoring (WRIM))

Obj 2.3 **Improve access to water rights information** for refuges in Pacific Southwest Region to help refuges meet legal requirements.

(Data Management (DM), Systems Development (SD), Water Resources Inventory and Monitoring (WRIM))

Thematic Area: Climate Change

Obj 2.4 Assess the vulnerability of refuge natural resources to climate change and use this information to develop refuge-specific climate adaptation strategies on at least 7 refuges by the end of FY 2015. Completion of adaptation strategies is dependent upon funding. (Abiotic Data (AD), Water Resources Inventory and Monitoring (WRIM), Coastal Marine Systems (CMS))

GOAL 3: Strategic Planning and Partnering To Meet Priority Refuge Needs

Thematic Area: Natural Resource Management Plans (NRMPs, formerly HMPs) And Inventory & Monitoring Plans (IMPs)

Obj 3.1 Develop a ***streamlined process for creating concise, user-friendly NRMPs and IMPs*** that will help refuge staff improve decision-making about managing natural resources of concern and can be created within 9 months.

(I&M Planning (IMPI), Adaptive Management (AM))

Thematic Area: I&M Planning and Partnerships

Obj 3.2 Use the Needs Assessment to **inform I&M Program Planning (annual, 5-year) and to advocate for meeting Region 8 refuge needs.**

(I&M Planning (IMPI))

Obj 3.3 Ensure that all Pacific Southwest Region I&M program services and products **reflect the natural resource priorities of refuges** and address strategic input from key partners and stakeholders.

(I&M Planning (IMPI))

Obj 3.4 **Collaborate with research, monitoring and conservation management partners to meet shared goals.**

(I&M Planning (IMPI))

Obj 3.5 **Support strategic planning** for refuges at the Regional Office.

(I&M Planning (IMPI))