The Passage Assessment Database (PAD), a Tool for Stream Habitat Connectivity Restoration via the Publicly Available CalFish Website

Presenters:
Anne Elston, Pacific States Marine Fisheries Commission, PAD Administrator
Laura Ryley, Pacific States Marine Fisheries Commission, CalFish Administrator
The History of PAD

- Developed in 2002 with guidance from the Fish Passage Forum.
- Developed in response to the need of a central database to house barrier data.
- Initially funded by the Coastal Conservancy and has since been funded by the California Department of Fish and Wildlife, US Fish and Wildlife Service and NOAA Fisheries.
Information Captured in the PAD

**Types of Barriers:**
- Road and Utility Crossings
- Dams, Debris Basins and Tidegates
- Flood Control Channels
- Unscreened Water Diversions
- Weirs and Grade Control Structures
- Log Jams
- Velocity Barriers
- Natural Barriers (waterfalls, grade, insufficient flow)

**Additional Information:**
- Removed barriers and screened diversions
- Structures where status of the barrier to fish passage is not known
- Species and stage
- Expansion of partial barriers to include temporal, temporal & partial, temporal & total

February 2013
Contributors to the PAD (since 2012):
CDFW, USFS, Trout Unlimited, CalTrans, NOAA, USFWS

Users of the PAD (since 2012):
CDFW, USFS, CalTrans, Trout Unlimited, NOAA, PSMFC, TNC, DWR, USBR, UCD and Stillwater Sciences

What’s New to PAD?
- New PAD standards
- New form for providing updates

What’s Coming?
- Passage status prior to removal
- Group responsible for removing the barrier
- Species benefited from barrier removal
## Current Status of PAD

Table 1. Number of PAD records by barrier status

<table>
<thead>
<tr>
<th>Fish Passage Status</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Barrier</td>
<td>1,959</td>
</tr>
<tr>
<td>Partial Barrier</td>
<td>1,469</td>
</tr>
<tr>
<td>Temporal Barrier</td>
<td>1,089</td>
</tr>
<tr>
<td>Temporal and Partial Barrier</td>
<td>120</td>
</tr>
<tr>
<td>Temporal and Total Barrier</td>
<td>32</td>
</tr>
<tr>
<td>Unknown Passage Status</td>
<td>4,403</td>
</tr>
<tr>
<td>Unassessed</td>
<td>1,832</td>
</tr>
<tr>
<td>Unscreened Diversion</td>
<td>4,992</td>
</tr>
<tr>
<td>Screened Diversion</td>
<td>356</td>
</tr>
<tr>
<td>Natural Total Barrier</td>
<td>1,312</td>
</tr>
<tr>
<td>Natural Partial Barrier</td>
<td>232</td>
</tr>
<tr>
<td>Not a Barrier</td>
<td>1376</td>
</tr>
<tr>
<td>Remediated, Fish Response Unconfirmed</td>
<td>416</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19,588</strong></td>
</tr>
</tbody>
</table>

Number of records **added** to the PAD since 2012: **322**
Number of records **updated** in the PAD since 2012: **3,777**
New PAD Standards

Developed to improve the PAD. The new standards affect:

1. Removed barriers
2. New PAD records
3. Locations of barriers
4. Barrier status designations

We would like:

1. Fish presence evidence (i.e., photos, fish counts) after barrier removal.
2. Site visits of barriers to determine that they are still there prior to entering them into the database.
3. Description of location if latitude or longitude isn’t accurate.
4. Barrier status from a fish passage professional.

Two new barrier statuses have been added to the PAD:

1. Unassessed - Structure identified but no evidence of a site survey.
2. Remediated, fish presence unconfirmed.
### I. Contact Information

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Agency:</td>
<td>Email:</td>
</tr>
</tbody>
</table>

### II. Type of Information

- [ ] New barrier  [ ] Update

### III. Location

- Stream name: 
- Tributary to: 
- Latitude: 
- Longitude: 
- Datum: 
- Are the coordinates accurate (i.e., taken at the barrier)? 
  - [ ] Yes  [ ] No
  - If the coordinates aren’t accurate, please explain where the barrier is located (i.e., distance (in feet) downstream and side of the bank looking downstream):
- Road route/name: 
- Milepost: 
- Photo(s)? 
  - [ ] Yes  [ ] No
  - Photo Description (e.g., looking upstream or downstream, before and after removal, photo of fish species upstream after removal):
- Land owner: 
- Structure owner: 

### IV. Structure

<table>
<thead>
<tr>
<th>PAD ID (if known):</th>
<th>Date Constructed:</th>
<th>Structure Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure type:</td>
<td></td>
<td>Structure Name:</td>
</tr>
<tr>
<td>□ Diversion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Screen present?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Bridge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Natural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ What sort of natural feature?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Fish trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Ford</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Log jam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Culvert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Weir</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Utility crossing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Flood control channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Tidegate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Grade control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Passage status: 
  - [ ] Total  [ ] Partial  [ ] Temporal  [ ] Temporal and partial  [ ] Temporal and total
  - Description:

- Is there a fish way present? 
  - [ ] Yes  [ ] No
  - Status of fish way (e.g., functioning, needs work, etc.):

### V. Survey Information

- Was there a survey conducted for this site? 
  - [ ] Yes  [ ] No
  - Survey date: 
  - Protocol used: 
  - Assessed by:
- Fish observed downstream? 
  - [ ] Yes  [ ] No
  - Species: 
  - Life stage: 
- Fish observed upstream? 
  - [ ] Yes  [ ] No
  - Species: 
  - Life stage: 
- Species blocked: 
  - Lifestage: 
  - Direction: 
  - Passage status:
- Was permission granted by the landowner for site access? 
  - [ ] Yes  [ ] No  [ ] Unknown
  - Do you have a hard copy of landowner permission? (if yes, please provide as attachment) 
  - [ ] Yes  [ ] No

### VI. Treatment Status and Recommendation

- Site treated? 
  - [ ] Yes  [ ] No  [ ] Unknown
- Treatment: 
  - Monitoring completed? 
  - [ ] Yes  [ ] No
  - Undergoing monitoring? 
  - [ ] Yes  [ ] No
  - Needs Monitoring? 
  - [ ] Yes  [ ] No
- Passage status after treatment: 
  - Date treated: 
  - Date removed: 
- Barrier removed by (name of organization): 
- Needs treatment? 
  - [ ] Yes  [ ] No
  - Treatment recommendation:
- Operations and maintenance plan? 
  - [ ] Yes  [ ] No  [ ] Unknown
  - Title of operations and maintenance plan: 
  - Date: 
  - Operator:

### VII. References and Attachments

<table>
<thead>
<tr>
<th>Reference Title:</th>
<th>Date:</th>
<th>Author:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Photo(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Survey Note/Report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Restoration/Treatment Report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Operations &amp; Maintenance Plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Accessibility

PAD can be accessed and viewed online via [www.calfish.org > PAD Program Page](http://www.calfish.org).
CalFish Mission

- Create, maintain, and enhance high quality, consistent data that are directly applicable to policy, planning, management, research, and recovery of anadromous fish and related aquatic resources in California.

- Provide data and information services in a timely manner in formats that meet the needs of users.
Accessing Data on CalFish

Map Viewer

Tabular Data Queries

Data Downloads

The Passage Assessment Database (PAD) is an ongoing inventory of known and potential barriers to anadromous fish in California. The PAD compiles currently available fish passage information from many different sources, and allows past and future barrier assessments to be standardized and stored in one place. The database is set up to capture basic information about each potential barrier. It is designed to be flexible. As the database grows, other modules may be added to increase data detail and complexity. This download includes the spatial data (in shapefile format) and the methodology documentation. The Passage Assessment Database is a product of the CalFish sponsored California Fish Passage Assessment Database Project. Please visit the Fish Passage Assessment Page for more information.
The viewer allows you to:
- View spatial data dynamically.
- View feature attributes.
- Perform basic analysis
- View metadata
- Print custom maps
- Review fish barrier location data and add new fish barriers
Passage Assessment Database point location data is updated quarterly in the CalFish Map Viewer.
CalFish Map Viewer – Feature Attributes

California Fish Passage Assessment Database [ds69]

Attribute:
- Label: PAD_ID
- Alias: PAD_ID
- Definition: Unique ID linking to additional information in the Passage Assessment database (PAd) (Interstate/StreamNet ID, 700,000 - 799,000)
- Definition Source: StreamNet
- Type: Double
- Width: 8
- Precision: 38
- Scale: 8
CalFish Map Viewer – Query Data
Tabular Data Queries

- Tabular data queries allow you to:
  - View data in an online tabular format.
  - Query data using multiple criteria.
  - Export results
  - Print results
Passage Assessment Database tabular data is updated daily (or as often as new data becomes available) through the PAD Data Portal.
Data Downloads

Data download allows you to:

- View CalFish data on your own computer
- Create maps
- Perform analysis
- PAD data is updated quarterly

Passage Assessment Database

File Size: 2.7Mb  Publication date: 2/8/2013

The Passage Assessment Database (PAD) is an ongoing inventory of known and potential barriers to anadromous fish in California. The PAD compiles currently available fish passage information from many different sources, and allows past and future barrier assessments to be standardized and stored in one place. The database is set up to capture basic information about each potential barrier. It is designed to be flexible. As the database grows, other modules may be added to increase data detail and complexity. This download includes the spatial data (in shapefile format) and the methodology documentation. The Passage Assessment Database is a product of the CalFish sponsored California Fish Passage Assessment Database Project. Please visit the Fish Passage Assessment Page for more information.
PAD Program Page – About Tab

California Fish Passage Assessment Database

The California Fish Passage Assessment Database (PAD) is an ongoing map-based inventory of known and potential barriers to anadromous fish in California, compiled and maintained through a cooperative interagency agreement. The PAD compiles currently available fish passage information from many different sources, allows past and future barrier assessments to be standardized and stored in one place, and enables the analysis of cumulative effects of passage barriers in the context of overall watershed health. The database is set up to capture basic information about each potential barrier. It is designed to be flexible. As the database grows, other modules may be added to increase data detail and complexity.

Introduction

The Passage Assessment Database (PAD) is an ongoing map-based inventory of known and potential barriers to anadromous fish in California, compiled and maintained through a cooperative interagency agreement. The PAD compiles currently available fish passage information from many different sources, allows past and future barrier assessments to be standardized and stored in one place, and enables the analysis of cumulative effects of passage barriers in the context of overall watershed health. The database is set up to capture basic information about each potential barrier. It is designed to be flexible. As the database grows, other modules may be added to increase data detail and complexity.

Data Categories

Data categories in the PAD database were chosen to meet the needs of broader fish passage improvement community and were reviewed by the member agencies of the California Fish Passage Forum. Some of the most important data collected about barriers are those related to the location, ownership, structure type, and the degree of impassibility – passage status. The database also captures barrier priority within a watershed assigned by the original data set source if that information was provided. A more detailed description of the database, the data collection procedure and data quality and limitations can be found in the PAD Methodology document.

To standardize data entry sheets for collecting new barrier/stream structure information, the Fish Passage Forum developed a Rapid Entry Field Form - First Pass Fish Passage Data Sheet. This one-page form is intended for fast, simple inventories of all types of fish passage problems and it can be used during any other type of stream survey or restoration work. For other standardized field forms, please consult the DFG Restoration Manual.

Geographic Information

All PAD records are stored with geographic location information where each site is mapped and assigned latitude/longitude coordinates. Each barrier record is also indexed to the high-resolution National Hydrography Dataset (NHD) developed by USGS at a 1:24,000 scale. The NHD is used to assign a stream address to a PAD record by capturing the unique identifier for each NHD line segment and the measure along the segment that represents the barrier location.

Referencing each barrier record to a common hydrography (the NHD), many different data formats brought into the PAD are standardized, and become easy to combine with other fisheries data tied to the same hydrography.

Data Sources
Feedback
PAD Program Page – Data Access Tab

Programs > Program Index > California Fish Passage Assessment Database

California Fish Passage Assessment Database
Compiles currently available fish passage information from many different sources, allows past and future barrier assessments to be standardised and stored in one place, and enables the analysis of cumulative effects of passage barriers in the context of overall watershed health.

About | Data Access | Status and Source | Additional Resources

- **California Fish Passage Assessment Database**
  - Yes - Layer name: California Fish Passage Assessment Database
  - The CalFish map viewer displays PAD records with other fisheries and stream related data sets, and allow one to analyze barriers in relation to each other and in the context of the watershed. Each site info includes structure and stream name, type and barrier status, protocol used for passage assessment, survey team and survey date, ownership information and other site specifics. User-defined queries can narrow down the search through the barrier data and provide summaries and tables. Both the customized maps and query result table can be printed out or exported.

- **CalFish Tabular Data**
  - Yes - Data Category: Fish Barriers
  - The CalFish database query gives you access to detailed tabular data where query results can be narrowed by including criteria such as county or stream.

- **CalFish Data Downloads**
  - Yes - Passage Assessment Database (PAD)
  - On the CalFish data downloads page you will find a variety of spatial data sets in compressed Shapefile format available for download.

- **PAD Data Portal**
  - The PAD Data Portal offers an extended option for tabular summaries, reports and queries of the fish passage barrier database, hosted on the DFG Data Portal.

- **PAD Document Library**
  - The PAD Document Library allows access to PAD original data source references as well as barrier photographs, hosted on the DFG Document Library.

- **PAD Data Review & New Barrier Mapping Application**
  - The PAD Data Review & New Barrier Mapping Application enables you to review PAD records in a stand-alone map viewer and send review comments to PAD administrator via an online form. It also enables you to geo-reference new barrier records and obtain latitude/longitude coordinates, and to submit basic information about each new barrier site. A selection from street map, topo map and satellite imagery as a background is available for an easy navigation through the watersheds. Use the tutorial document as a guide for the tool.
California Fish Passage Assessment Database

Compiles currently available fish passage information from many different sources, allows past and future barrier assessments to be standardized and stored in one place, and enables the analysis of cumulative effects of passage barriers in the context of overall watershed health.

Publication Date
9/7/2012

Update Frequency
Quarterly

Extent
Statewide

Originator
California Department of Fish and Game
U.S. Fish and Wildlife Service
California Coastal Conservancy

Dataset Credit
Pacific States Marine Fisheries Commission

Point of Contact
Feedback regarding the accuracy and updates of the data presented here are welcome. Please email or mail any corrections and updated information to:

anne.elston@dfg.ca.gov

800 S Street, Sacramento, CA 95814
Ph: (916) 327-3937
Detailed reports describing fish passage barriers removed in 2011 are available.

To view reports please begin by selecting a region of interest.
Reports for barriers remediated and a map based search tool to access these reports are a recent addition to the CalFish site.
CalFish Tool Ideas

Reports for Fish Passage Barriers Remediated

Detailed reports describing fish passage barriers removed in 2011 are available.

To view reports please begin by selecting a region of interest.
CalFish Tool Ideas
Reports for Fish Passage Barriers Remediated

Detailed reports describing fish passage barriers removed in 2011 are available.
Each barrier location is labeled with its unique PAD ID. Click the PAD ID to open a detailed report for the barrier removed.
CalFish Tool Ideas
Reports for Fish Passage Barriers Remediated

Site Name: Culvert
Stream Name: Barker Creek
Structure Owner: U.S. Forest Service
Year Removed: 2011
Barrier Description Prior to Removal: Circular barrier
Site Description After Removal: Not available
Site Status After Removal: Remediated, fish response unconfirmed
Count of Total Barriers Downstream: 1 natural barrier
Count of Barriers with Unknown Passage Status Downstream: 23
Distance to Next Barrier Upstream with Barrier Status and PAD ID: 1.2 miles, Partial barrier, 713308
Distance to Next Total Barrier Upstream with PAD ID: Not applicable

PAD ID: 707810
Tributary To: Hayfork Creek
Barrier Removed By: Not available
Barrier Status Prior to Removal: Total barrier
Species Benefited After Removal: Not available
Count of Partial Barriers Downstream: 2
Count of Unscreened Diversions Downstream: 22
Distance to End of Natural Anadromy: Unknown

*Site statistics based on February 2013 version of the Passage Assessment Database
Welcome to the CalFish Getting Started page. This page acts as a central location for tools and information to help you navigate and search for data within the CalFish site.

**Data Explorer Tool**

The Data Explorer tool helps you find data and determine how data can be accessed. CalFish data are available in three formats:

- **Table**: Query data tables directly.
- **Geographic**: An interactive map viewer.
- **Download**: Save shapefiles to your computer and use in your own GIS software.

A unique CalFish dataset may be available in one, two, or three of these formats. The Data Explorer will clearly state the available formats for each dataset, in addition to any special instructions needed to access the data in each format.

**Data Tracking Report**

For a summary of CalFish data additions or updates please refer to the Data Tracking Report. This report documents when updates to existing data or additions of new data have taken place on the CalFish site since October 2011 in descending order. This report will be updated whenever a data update or addition is made.

**Map Viewer Bookmarks**

CalFish Map Viewer Bookmarks are available to allow for easier access to instances of the CalFish map viewer preloaded with collections of data that offer information to help answer several common fishery, restoration, and related questions. Each bookmark is paired with a tutorial that describes the contents of the bookmark and how the data it offers can be used to answer the specific question of interest in an example area.

**Tutorials**

CalFish Tutorials are available to give you step by step instructions specific to several core tools that are part of the site.

**Resources page**

The Resources page provides access to a variety of additional resources that are intended to provide technical and biological information as well as points of contact for those interested in or involved with California's fisheries resources.

**FAQ**

Still have questions? Please refer to our FAQ page.

**Site Map**

The Site Map makes site navigation easier by giving an overview of and links to all the pages within the CalFish site.
Data Explorer Tool
Makes Finding Data Quicker and Easier

- Start search by selecting a data category
- Refine search by selecting a data type
- Select a dataset from the search results

Details specific to accessing the dataset selected are returned
Map Viewer Bookmarks

CalFish bookmarks are links to instances of the CalFish map viewer preloaded with specific collections of data grouped to offer information to help answer several common fisheries restoration related questions. The bookmarks load at a statewide extent but can be zoomed into a location of interest. Each bookmark is paired with a tutorial that describes the datasets included in the bookmark and how this data can be used to answer the specific question of interest in an example area.

**MAP VIEWER BOOKMARK: What Data Does CalFish Offer to Assess Locations of Monitoring Occurring in My Area of Interest?**
Opens a statewide map preloaded with salmonid monitoring datasets. The dynamic map can be zoomed to a specific area of interest.

**CALFISH TUTORIAL: Using the Locations of Monitoring Bookmark to Assess Salmonid Monitoring in an Example Area of Interest. (1.2 MB PDF)**
This tutorial discusses the locations of monitoring bookmark and how the data it offers can be used to help assess salmonid monitoring efforts in a specific example area of interest.

**MAP VIEWER BOOKMARK: What Data Does CalFish Offer to Access Nonindigenous Species in My Area of Interest?**
Opens a statewide map preloaded with nonindigenous species datasets. The dynamic map can be zoomed to a specific area of interest.

**CALFISH TUTORIAL: Using the Nonindigenous Species Bookmark to Assess Observations of Nonindigenous Species in an Example Area of Interest (2.0 MB PDF)**
This tutorial discusses the nonindigenous species bookmark and how the data it offers can be used to help assess invasive species found in a specific example area of interest.

**MAP VIEWER BOOKMARK: What Data Does CalFish Offer to Assess Protected Lands and Waters in My Area of Interest?**
Opens a statewide map preloaded with protected lands and waters datasets. The dynamic map can be zoomed to a specific area of interest.

**CALFISH TUTORIAL: Using the Protected Lands and Waters Bookmark to Assess Protected Areas In An Example Area of Interest (2.2 MB PDF)**
This tutorial discusses the protected lands and waters bookmark and how the data it offers can be used to help assess protected areas in a specific example area of interest.

**MAP VIEWER BOOKMARK: What Data Does CalFish Offer to Assess Water Quality in My Area of Interest?**
Opens a statewide map preloaded with water quality datasets. The dynamic map can be zoomed to a specific area of interest.

**CALFISH TUTORIAL: Using the Water Quality Bookmark to Assess Water Quality in an Example Area of Interest (4.5 MB PDF)**
This tutorial discusses the water quality bookmark and how the data in it offers can be used to help assess water quality in a specific example area of interest.
New CalFish Tutorials
CalFish as a Resource for Implementing NOAA Recovery Plans

CALFISH TUTORIAL: CalFish as a Resource for Implementing the Draft South-Central California Steelhead Recovery Plan (1.1 MB PDF)
The Recovery Plan identifies threat sources that must be addressed and recovery actions to be taken to meet the plan's goal of preventing the extinction of south-central California steelhead. CalFish provides access to many different types of data that will help to understand and assess threat sources and plan recovery actions. A detailed description of these data and how to best use them is given in the tutorial document.

CALFISH TUTORIAL: CalFish as a Resource for Implementing the Southern California Steelhead Recovery Plan (0.5 MB PDF)
The Recovery Plan identifies threat sources that must be addressed and recovery actions to be taken to meet the plan's goal of preventing the extinction of southern California steelhead. CalFish provides access to many different types of data that will help to understand and assess threat sources and plan recovery actions. A detailed description of these data and how to best use them is given in the tutorial document.
Other CalFish Updates – Coming Soon

- Layer that maps the CDFW anadromous fish passage barrier priority lists for 2011 and 2012.

- Map based search tool that offers links to CDFW north coast stream inventory report documents available for download.
Any questions or feedback about the Passage Assessment Database or CalFish?

PAD Contact: anne.elston@wildlife.ca.gov

CalFish Contact: laura.ryley@wildlife.ca.gov
Before and after photos of a remediated barrier to fish passage on Barker Creek in Trinity County.