# Efficient Operation of DIDSON: Site Selection

Walt Duffy, Matt Metheny,
Zack Larson and Kerrie Pipal

# Site Criteria to Consider

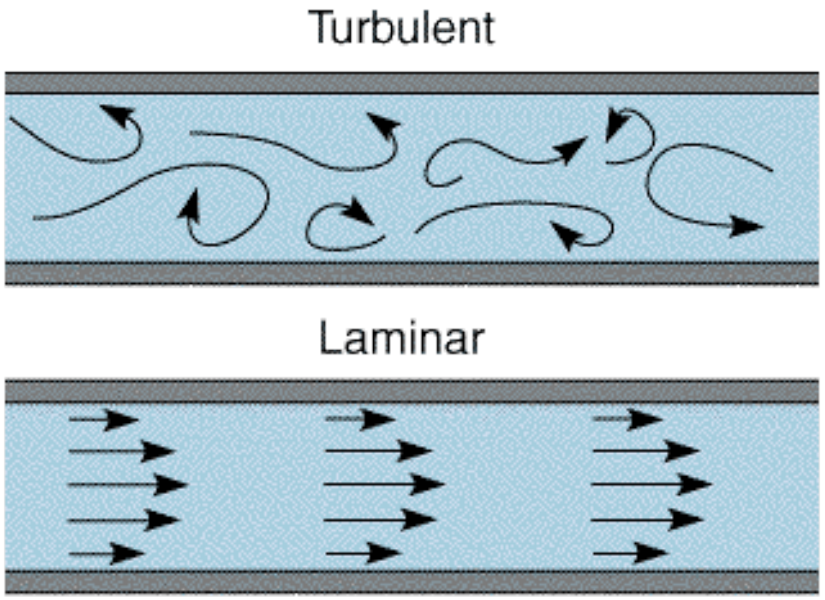
- Single channel
- Laminar flow
- Planar bottom
- Fish actively migrating (no milling behavior)
- Downstream of spawning areas
- Easily accessible
- Access to power
- Two categories of sites:
  - Wide, high velocity sites
  - Narrower, lower velocity sites

# Single Channel

- Single channel simplifies analysis and interpretation of data.
  - Single channel with well defined thalweg percieved to be ideal.
- Behavior of fish may change with flow in multiple channels.

# Laminar Flow

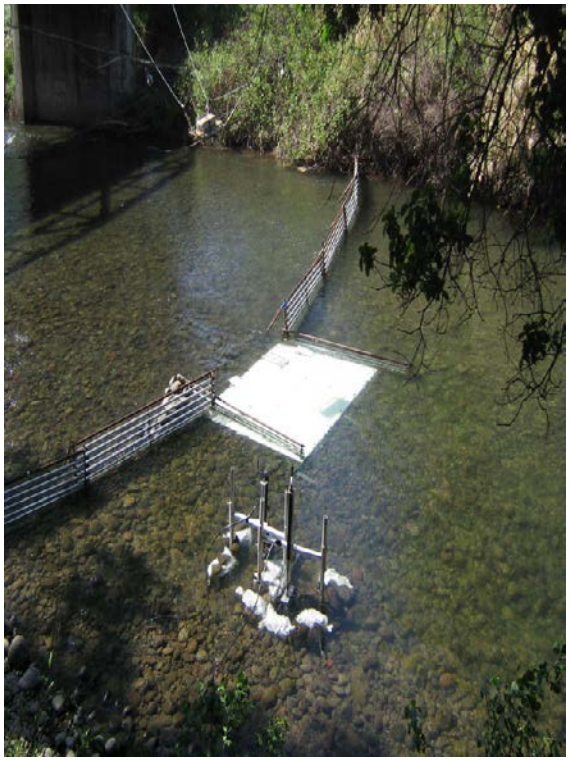
- Less of a “noise” problem, as with hydroacoustics.
- More important in fish migration behavior:
  - Laminar flow promotes constant migration.
  - Turbulent flow may lead to milling behavior.

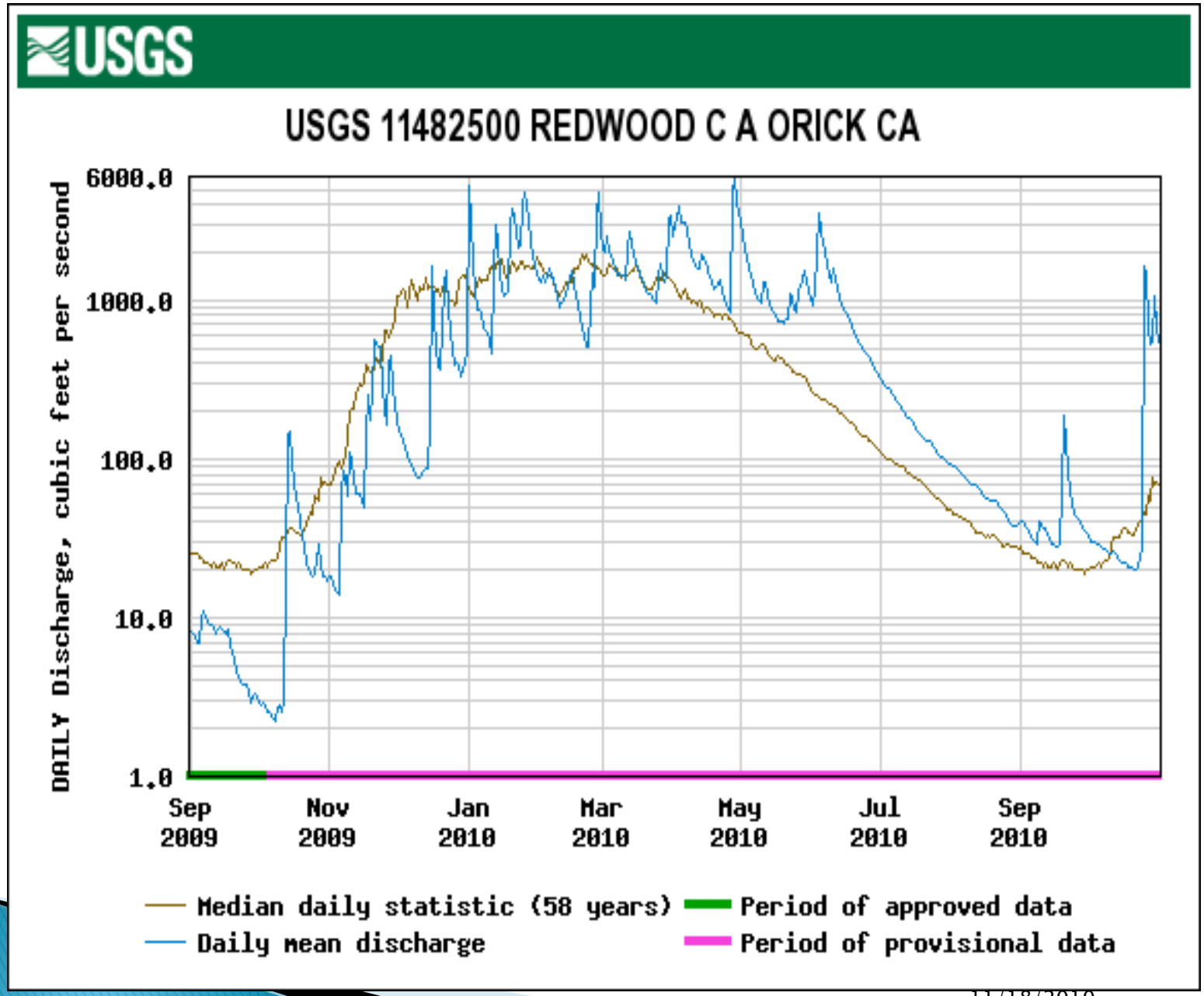


# Weir to Restrict Area

Redwood Creek
Weir sociologically prohibited

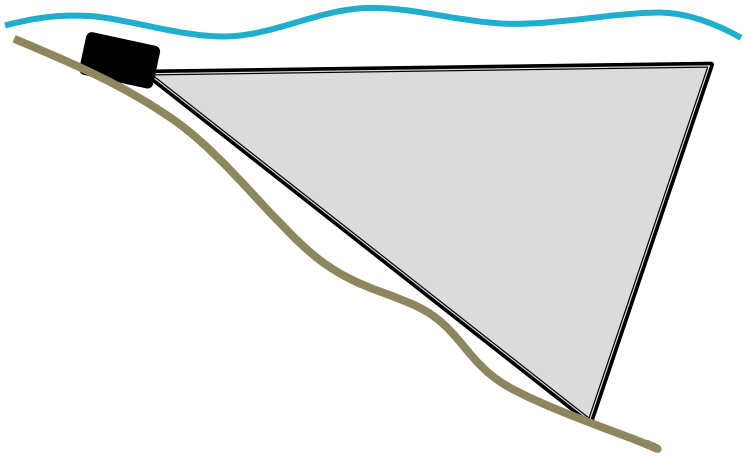
Mill Creek
Weir functional

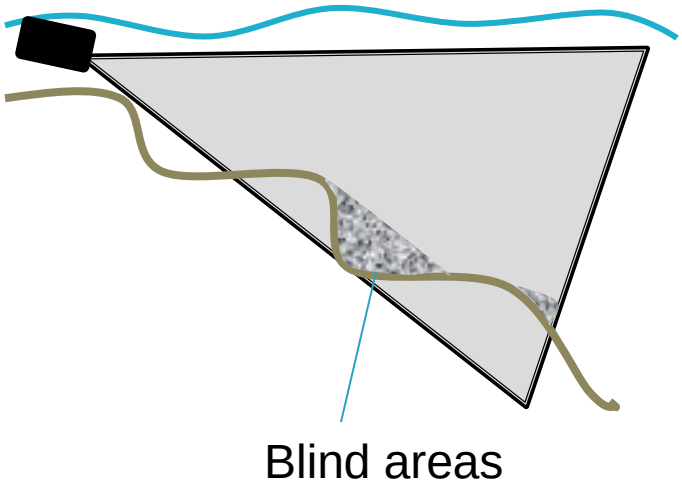



USGS
USGS 11482500 REDWOOD C A ORICK CA
DAILY Discharge, cubic feet per second
6000.0
1000.0
100.0
10.0
1.0
Sep 2009
Nov 2009
Jan 2010
Mar 2010
May 2010
Jul 2010
Sep 2010
Median daily statistic (58 years)
Daily mean discharge
Period of approved data
Period of provisional data

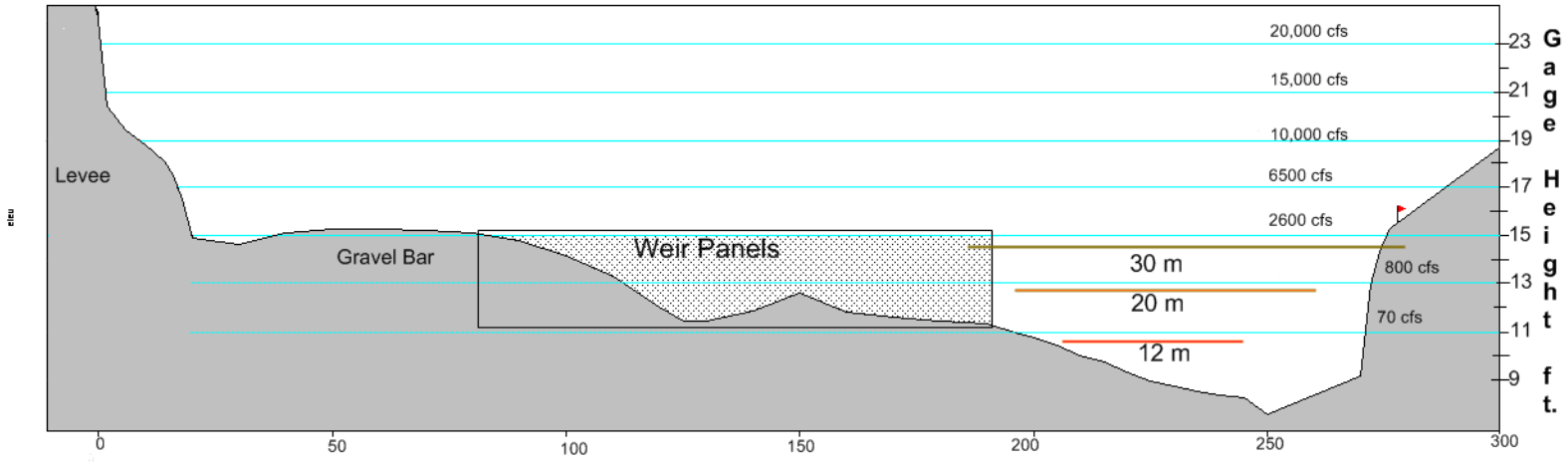
# Planar Bottom

- Planar bottom (top) allows DIDSON to cover entire channel.
- Non-planar bottom often results in blind spots.
- Obstructions (logs, boulders) can also limit visibility.





# Redwood Creek Botton Contour



# Redwood Creek DIDSON Site

# Fish Actively Migrating

- A site fish actively migrate through results in a cleaner, more easily analyzed data set.
  - Milling behavior induced by turbulent flow or other physical features and greatly increase the number of both upstream and downstream observations per fish.
  - Distinguishing upstream migration from downstream creates additional work, as well as an analytical challenge.

# Downstream of Spawning Areas

- Reason is obvious, if the objective is to produce an escapement estimate.

# Easily Accessible

- Accessibility is a two-sided issue
- Positives
  - It facilitates moving equipment to and from the site.
  - It minimizes travel time and time in the field.
- Negatives
  - It permits others access to the DIDSON site.

# Human Access

- Visibility invites the curious, as well as those with other intentions.
- Human access can influence fish behavior, inducing milling.

# Access to Power

- Access to AC power is valuable.
- Having AC power facilitates continuous operation of the DIDSON.
  - May require a drop line.
- Lacking AC power, one must rely on generators and batteries (increasing labor and decreasing reliability.
- Pipal et al. (2010) estimate a DIDSON, rotator, lap top and external hard drive requires 1,921 Watt hrs/day and 130 Amp hrs/day.

# Discussion and Questions