California Department of Fish and Wildlife

The Mission of the Department of Fish and Wildlife is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

Jon Jankovitz
District Fisheries Biologist
Santa Cruz/San Mateo/San Francisco Counties
Topics of Discussion

* Coastal Monitoring Program (CMP)

* Adult steelhead and coho salmon estimates and run timing in San Lorenzo Watershed

* Sports fishing in the San Lorenzo River

* Aquatic Invasive Species
California Coastal Monitoring Program (CMP)
California Coastal Monitoring Program (CMP)

CDFW Fish Bulletin 180 (Adams et al 2011)

* Statewide program:
  * Salmon and steelhead
  * Estimate status and trends
  * Major focus on adult returns
ESA recovery goals are based on adult numbers returning to spawn.

- San Lorenzo River Watershed Goals:
  - Coho 3,800 adults (NMFS 2012)
  - Steelhead 3,200 adults (Spence et al 2012).

- Clear downward trend in juvenile abundance (J. Smith, D. Alley).
  - How does this affect adult returns??

- Lack of baseline information and no adult or spawner surveys completed in region (except Scotts Creek).

- CCC coho salmon are a “needle in a haystack”.
CMP Basic Overview

Coastal Santa Cruz and San Mateo

10-15% Regional Random Sample

Redd Surveys

Life Cycle Monitoring Station Scott Creek

Trapping

Intensive Redd Surveys

Spawner : Redd

Regional Estimate of Spawning Adults
San Lorenzo Watershed

89 total reaches (172.5 km)
39 reaches of coho spawning (84.4 km)
Pescadero “Textbook” Steelhead Redd
Defined pot and tailspill

Scott Coho (?) Redd
Large, sloppy, lacking definition

Redd Surveys
Measuring Redds
Classifying Unknown Redds to Species
Coho vs Steelhead

Logit Regression
Logit P = -4.074 + (0.13 \text{ day}) – (0.918*\text{redd area});
steelhead > 0.5; otherwise coho

- Gallagher and Gallagher 2005:
  Redd surface area and day observed relate to species in Mendocino County.
  - Logit Regression misclassified:
    - Only 3.8\% of redds in Mendocino County.
    - Only 6.8\% of steelhead redds American River.
    - 38\% of steelhead redds in Scotts Creek (D Frechette 2011).

* Model may need to be refined to better describe Santa Cruz Mountains.
* Problematic due to low number of coho and lower likely of observing a spawning coho.
Benefits of Spawner Surveys

- Useful baseline information for general estimates of adult returns.
- Useful in monitoring trends in adult returns.
- Useful for other management objectives:
  - Passage issues, most used spawning habitat, relate to juvenile sampling, redd densities, spawning distribution, run timing
- Excellent for obtaining info on where coho adults stray and spawn.
- Do not require handling ESA species.
- Efficient & cost effective.
Local Challenges

* Model to classify unknown redds may need refinement.
* Regional estimates. Not watershed approach.
* Two LCMS required per region.
* Partners and Long term funding.
* Random sample requires extensive landowner permission.
  * Rotating Panel: Entire spawning universe sampled every 12 years.
San Lorenzo
Adult Steelhead Results
## Steelhead Observations

<table>
<thead>
<tr>
<th>Year</th>
<th>Reach</th>
<th>Length</th>
<th># Redds</th>
<th>redd/km</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>Mt. Charlie Gulch</td>
<td>2.1 km</td>
<td>6</td>
<td>2.83</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Bear Creek</td>
<td>1.7 km</td>
<td>8</td>
<td>4.75</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL (2.2%)</strong></td>
<td>3.8 km</td>
<td>14</td>
<td><strong>3.68 redd/km</strong></td>
<td><strong>12</strong></td>
</tr>
<tr>
<td>2012-2013</td>
<td>San Lorenzo (Gorge)</td>
<td>3.0 km</td>
<td>30</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Upper San Lorenzo</td>
<td>2.7 km</td>
<td>2</td>
<td>0.7</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Lower Zayante</td>
<td>1.0 km</td>
<td>27</td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mt. Charlie Gulch</td>
<td>2.1 km</td>
<td>2</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Bear Creek</td>
<td>1.7 km</td>
<td>2</td>
<td>1.2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Kings Creek</td>
<td>2.6 km</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Unnamed Trib.</td>
<td>0.8 km</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL (7.7%)</strong></td>
<td>13.9</td>
<td>63</td>
<td><strong>4.53 redd/km</strong></td>
<td><strong>42</strong></td>
</tr>
<tr>
<td>2013-2014</td>
<td>San Lorenzo (Brookdale)</td>
<td>1.0 km</td>
<td>9</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>San Lorenzo (Boulder Creek)</td>
<td>2.0 km</td>
<td>30</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Zayante</td>
<td>3.0 km</td>
<td>23</td>
<td>7.7</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Zayante</td>
<td>2.9 km</td>
<td>21</td>
<td>7.2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL (4.5%)</strong></td>
<td>8.9</td>
<td>83</td>
<td><strong>9.33 redd/km</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>
## Results

### Spawning Adult Steelhead

<table>
<thead>
<tr>
<th>San Lorenzo</th>
<th>No. of Reaches</th>
<th>% of Spawning Universe</th>
<th>Standard Error</th>
<th>Low 95% CI</th>
<th>Point Estimate</th>
<th>High 95% CI</th>
<th>Low 95% CI</th>
<th>Point Estimate</th>
<th>High 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>7</td>
<td>7.7%</td>
<td>126.93</td>
<td>558</td>
<td>810</td>
<td>1062</td>
<td>0</td>
<td>648</td>
<td>1717</td>
</tr>
<tr>
<td>2013-2014</td>
<td>4</td>
<td>4.5%</td>
<td>136.47</td>
<td>375</td>
<td>809</td>
<td>1243</td>
<td>343</td>
<td>777</td>
<td>1211</td>
</tr>
<tr>
<td>2014-2015</td>
<td>4</td>
<td>4.5%</td>
<td>TBA</td>
<td></td>
<td>TBA</td>
<td></td>
<td></td>
<td>TBA</td>
<td></td>
</tr>
</tbody>
</table>
Steelhead Observations: Timing

- 60% of fresh steelhead redds observed in March (n=46; N=77)
- 69% of adult steelhead observed in March (n=36; N=52)
- 38% of steelhead redds observed in April (n=29; N=77)
Adult Steelhead Size Distribution

- 2012-2013 Adult Steelhead observed regionally. N=227
- 30-85 cm Fork Length (~12-34 inches); Avg: 59.9 cm (~24 inches)
San Lorenzo
Coho Salmon Results
San Lorenzo Coho Observations

* **2011-2012:** No coho observed
  * ocean return coho verified in San Vicente Creek

* **2012-2013:** 3 adult coho observed in Gorge
  * 1 coho redd observed in San Lorenzo CMP sample (based on logistic regression)

* **2013-2014:** 2 adult coho observed (outside GRTS)
  * No coho or coho reds in GRTS sample in San Lorenzo
  * 19 jack coho taken from San Lorenzo Lagoon to Kingfisher Flats Genetic Conservation Hatchery
  * 1 jack coho taken from Felton Diversion Dam

* **2014-2015:** 2 adult coho observed
  * Carcass (?) in Bean Creek late January
## Coho Observations Timing

<table>
<thead>
<tr>
<th>Program &amp; Year</th>
<th>Live Ocean Return Adults</th>
<th>Carcasses</th>
<th>Watershed</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMP 2011-2012</td>
<td>2</td>
<td>0</td>
<td>San Vicente</td>
<td>Feb 17</td>
</tr>
<tr>
<td>CMP 2012-2013</td>
<td>2</td>
<td>2</td>
<td>San Lorenzo/Scotts</td>
<td>Jan 24 &amp; Feb 7</td>
</tr>
<tr>
<td>CMP 2013-2014</td>
<td>8*</td>
<td>2</td>
<td>San Lorenzo/San Vicente/Waddell/Scotts</td>
<td>Feb. 3 - March 20</td>
</tr>
<tr>
<td>MBSTP 2013-2014</td>
<td>20*</td>
<td>NA</td>
<td>San Lorenzo Lagoon and Felton Diversion</td>
<td>Jan 29 &amp; Mar 3</td>
</tr>
<tr>
<td>CMP 2014-2015</td>
<td>34</td>
<td></td>
<td>Pescadero/Waddell/Scotts/San Lorenzo</td>
<td>Dec 29 - Mar 4</td>
</tr>
</tbody>
</table>

Other Areas of California: Coho Migrate November-January
<table>
<thead>
<tr>
<th>San Lorenzo Watershed</th>
<th>No. of Reaches</th>
<th>% Spawning Universe</th>
<th>Number of Coho Redds</th>
<th>Number of Adult Coho</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low 95% CI</td>
<td>Point Estimate</td>
</tr>
<tr>
<td>2011/2012</td>
<td>1</td>
<td>2.60%</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>2012/2013</td>
<td>2</td>
<td>5.20%</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>2013/2014</td>
<td>4</td>
<td>10.20%</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>2014/2015</td>
<td>9</td>
<td>23.8%</td>
<td>4</td>
<td>17</td>
</tr>
</tbody>
</table>

* 20 jack coho taken from San Lorenzo Watershed
Sport Fishing

http://www.northwestflyfisherman.com/SiteImages/coastal_chrome2.jpg

http://2.bp.blogspot.com/-JheR9yCTVZc/TDzOwVpWtI/AAAAAAAABmU/WXKKEL6kGM/s1600/3+kids+fishing.JPG

San Lorenzo Sport Fishing

- Long history of recreational angling
- #2 attraction to Santa Cruz historically (Gibson 1994)
- A real human interaction to the resource
- Steelhead Report Card fees go directly towards steelhead restoration
Sport Fishing Regulations
San Lorenzo River

* Adult Steelhead only
* Valid Fishing License and Steelhead Report Card
* Can keep 2 hatchery origin steelhead per day.
* From Mouth to Lomond St bridge (~15mi)
* Barbless hooks only
* Season Dec. 1-March 7
  * Opening/closing day; Saturdays, Sunday, Wednesday; Legal holidays
* Subject to low flow closures

* Low flow closures for San Lorenzo not yet defined....

Low Flow Closures for Angling

* Anglers responsibility to check current status by calling (831)649-2886 before fishing.

* Decisions to open or close fishing takes place on Tuesday and Friday of each week

* Closed in 2013/2014 season due to high density of adults in lagoon and low flows inadequate for migration

* Not closed in 2014/2015 due to low angler effort and lack of success.

* Appropriate cut off based on stream gages is to be defined for less urgent judgment calls by CDFW.
* All hatchery steelhead have NO ADIPOSE FIN

* All fish with adipose fin enact (wild steelhead, hatchery/wild coho) must be released immediately
Aquatic Invasive Species (AIS)

http://www.flyline.com/_images/nzms_match.jpg
AIS Overview

- California Aquatic Invasive Species Management Plan (DFG 2008)
- Identified 51 AIS in California
  - New Zealand mudsnail
  - Quagga mussels
  - Zebra mussels
- Potential effects to water supply and general ecological health
Current distribution on NZMS

- Mainstem San Lorenzo River
  - Lower River to Felton
    - Heavy infestation in most places
  - Felton to Boulder Creek
    - Infested at least where public access

- Zayante
  - From SLR confluence ~100ft upstream

- Branciforte
  - From SLR confluence at least to De Laveaga Park

- NZMS Also know in Soquel Creek and Pilarcitos Creek

San Lorenzo River NZMS
Attention Anglers and River Users!

This reach of the San Lorenzo River is infested with New Zealand Mudsnaill (NZMS):
Main Entrance Henry Cowell State Park to River Mouth

Boulder Creek to Felton may be infested, too!

Gear must be changed or decontaminated before going to another reach or a different stream.

New Zealand Mudsnaill Facts:
- NZMS is a non-native, invasive snail from New Zealand.
- NZMS reduces food for steelhead and coho salmon by competing with native grazing insects.
- NZMS may be as small as a grain of sand up to 1/4".
- It takes only one NZMS to start a new population.
- Adult NZMS can live for weeks out of water on moist gear.
- Once established, it cannot be eliminated. Prevention is key.

To stop the spread of New Zealand Mudsnaill (NZMS):
- Travel in a downstream direction to prevent moving NZMS upstream
- Do not enter the San Lorenzo River upstream of the main entrance to Henry Cowell State Park if you have been downstream of the main entrance.
- After leaving the water, inspect and clean waders, boots, dogs and all gear used in the water. Remove visible snails with a stiff brush and follow with a rinse. Rinse water should not be discharged to a stream, street or storm drain.

TO DECONTAMINATE:
- Freeze waders at least 8 hours to kill NZMS - or -
- Have extra waders, boots and gear for use in the San Lorenzo River only. Store them separately from other gear
- Never transport live fish or other aquatic animals or plants to another area

For more information visit: http://www.dfg.ca.gov/invasives/mudsnaill/
NZMS population has been solidified in the San Lorenzo River.

* Aside from harsh chemical treatments in isolated areas, no effective eradication methods have been identified. (National Management and Control Plan for NZMS 2007)
* Chemical treatment not feasible for large area or if sensitive species present.
* Reduce the spread by taking precautionary measures and increasing awareness among river users.
Other Important San Lorenzo Fishes

**Endangered** Tidewater Goby

Pacific Lamprey

http://calfish.ucdavis.edu/files/79592display.jpg

http://ww2.hdnux.com/photos/13/70/12/3113609/7/628x471.jpg
References


Gibson, R.E. (1994, June 28). San Lorenzo was Full of Fish: The River was Santa Cruz's No. 2 Tourist Draw. San Jose Mercury News, p 1B


California Department of Fish and Game. 2008. California Aquatic Invasive Species Management Plan.