Pushing and Pulling I: Managing Water in the West: St. Mary Diversion Dam Fish Passage Model Study

RECLAMATION

Managing Water in the West

St. Mary Diversion Dam

Fish Passage Model Study

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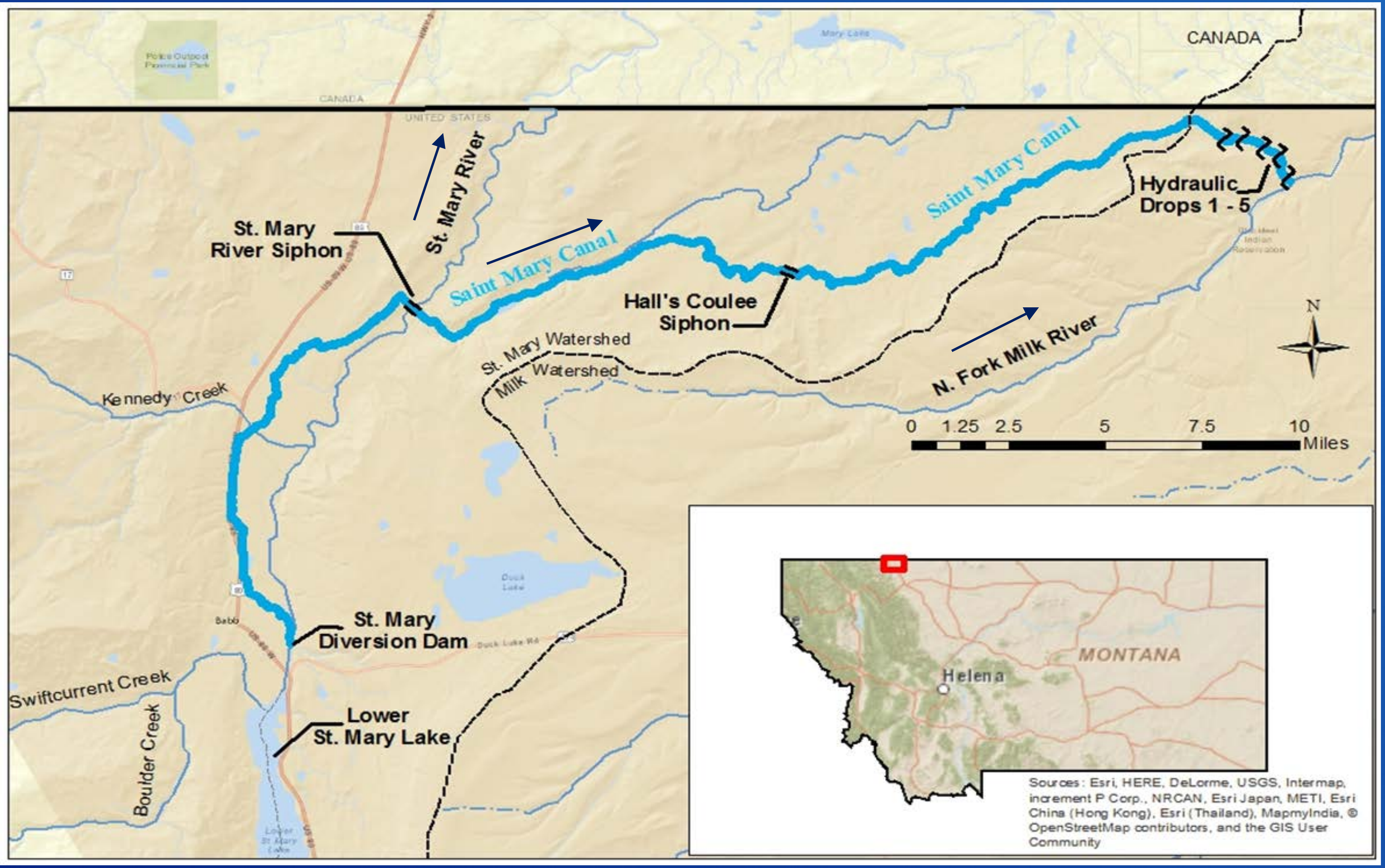
U.S. Department of the Interior
Bureau of Reclamation

St. Mary Diversion Dam General Location Map



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Existing Dam, Headworks, and Sluiceway Structures

Existing Dam Structure

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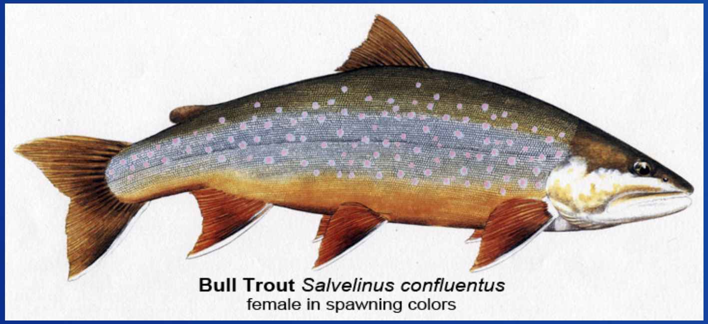
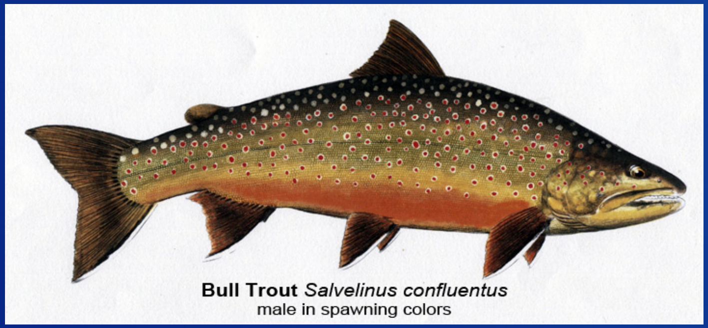
Bull Trout (*Savelinus confluentus*)

- **1999 Bull Trout listed as a threatened species under the Endangered Species Act**



http://www.hookhack.com/img/bulltrout_femalespawning.jpg

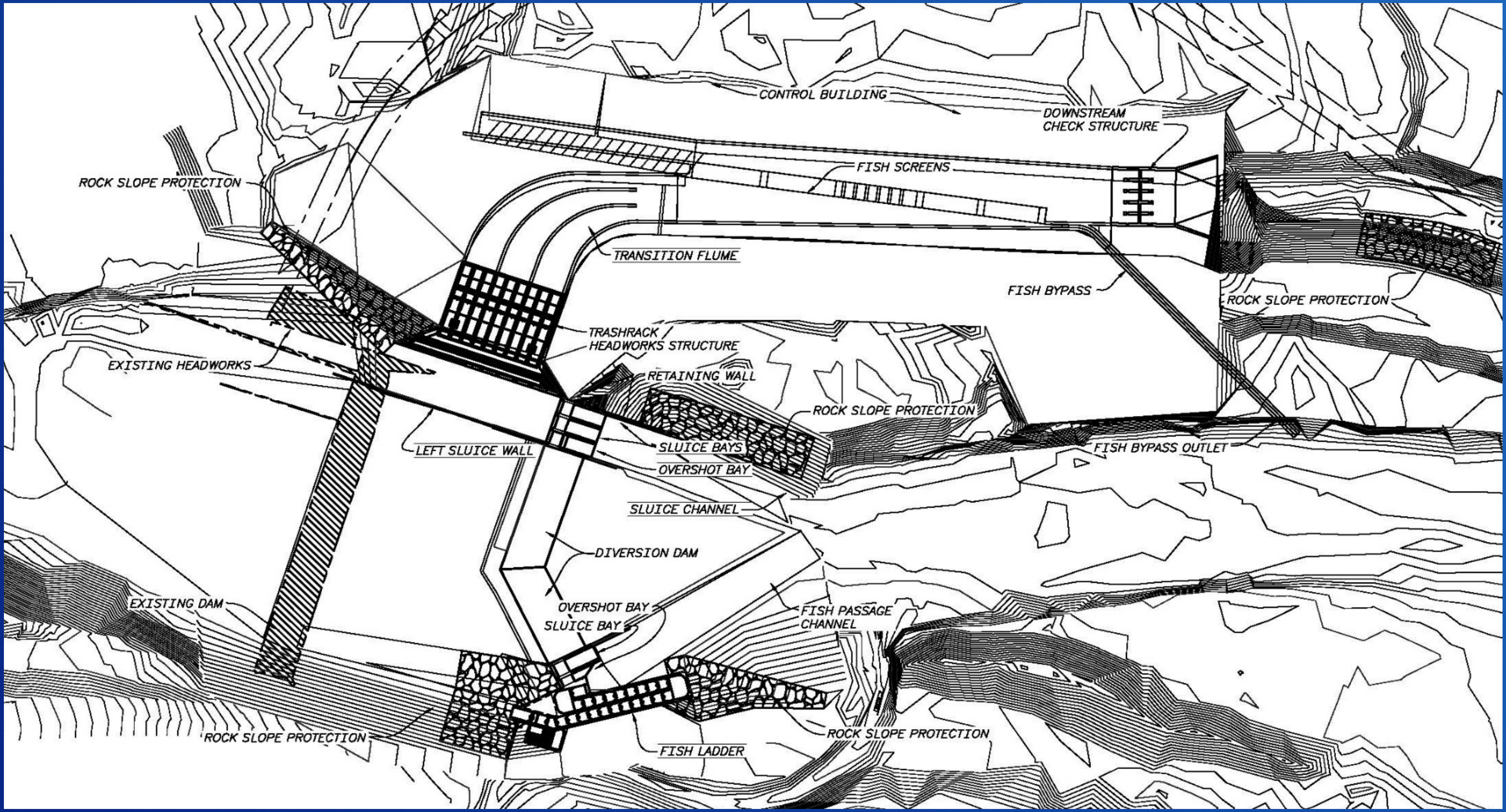


http://www.hookhack.com/img/bulltrout_malespawning.jpg

http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=E065

Irrigators, Stakeholders and Interested Parties

Plan View



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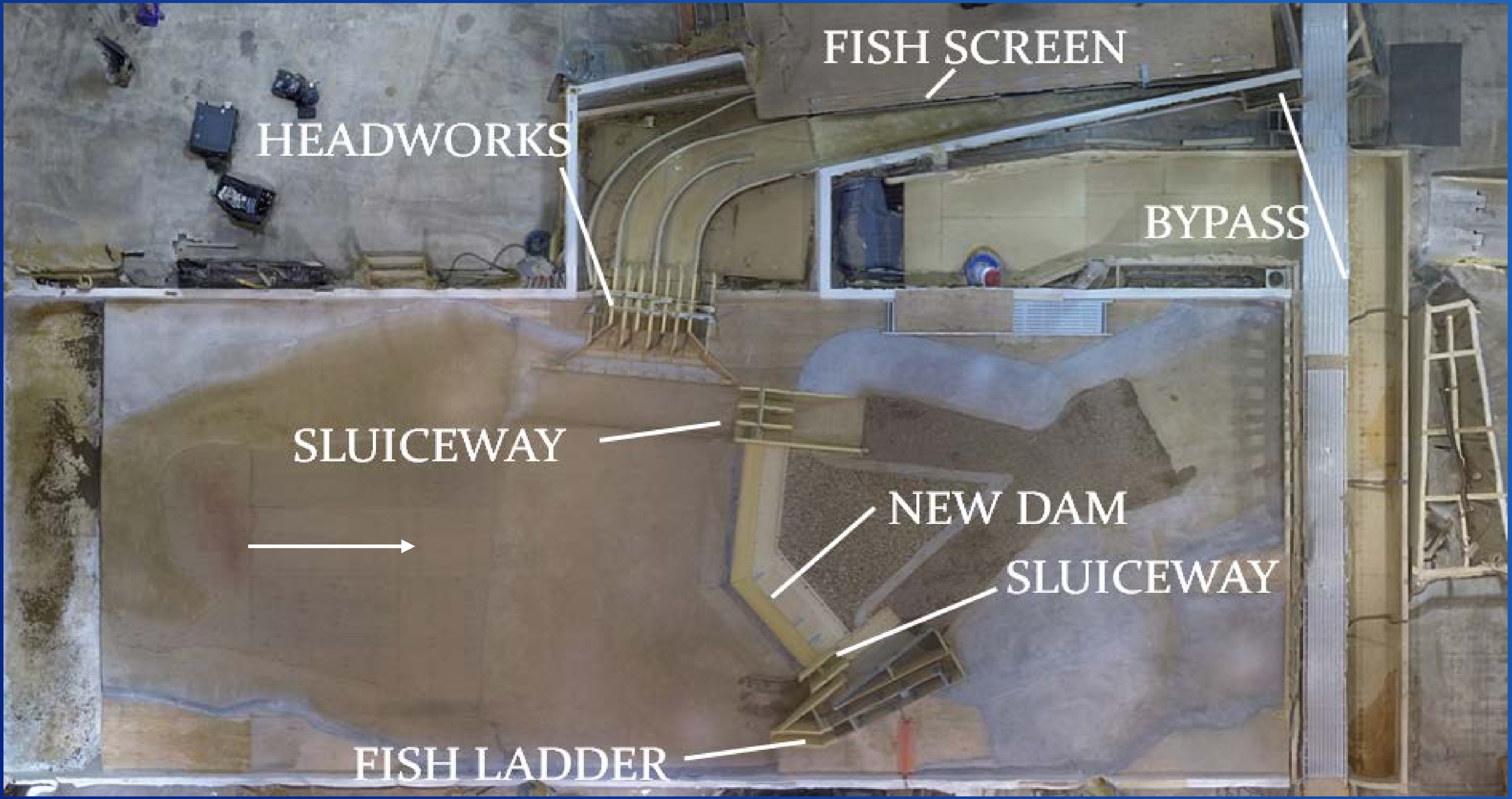
Aerial Photograph



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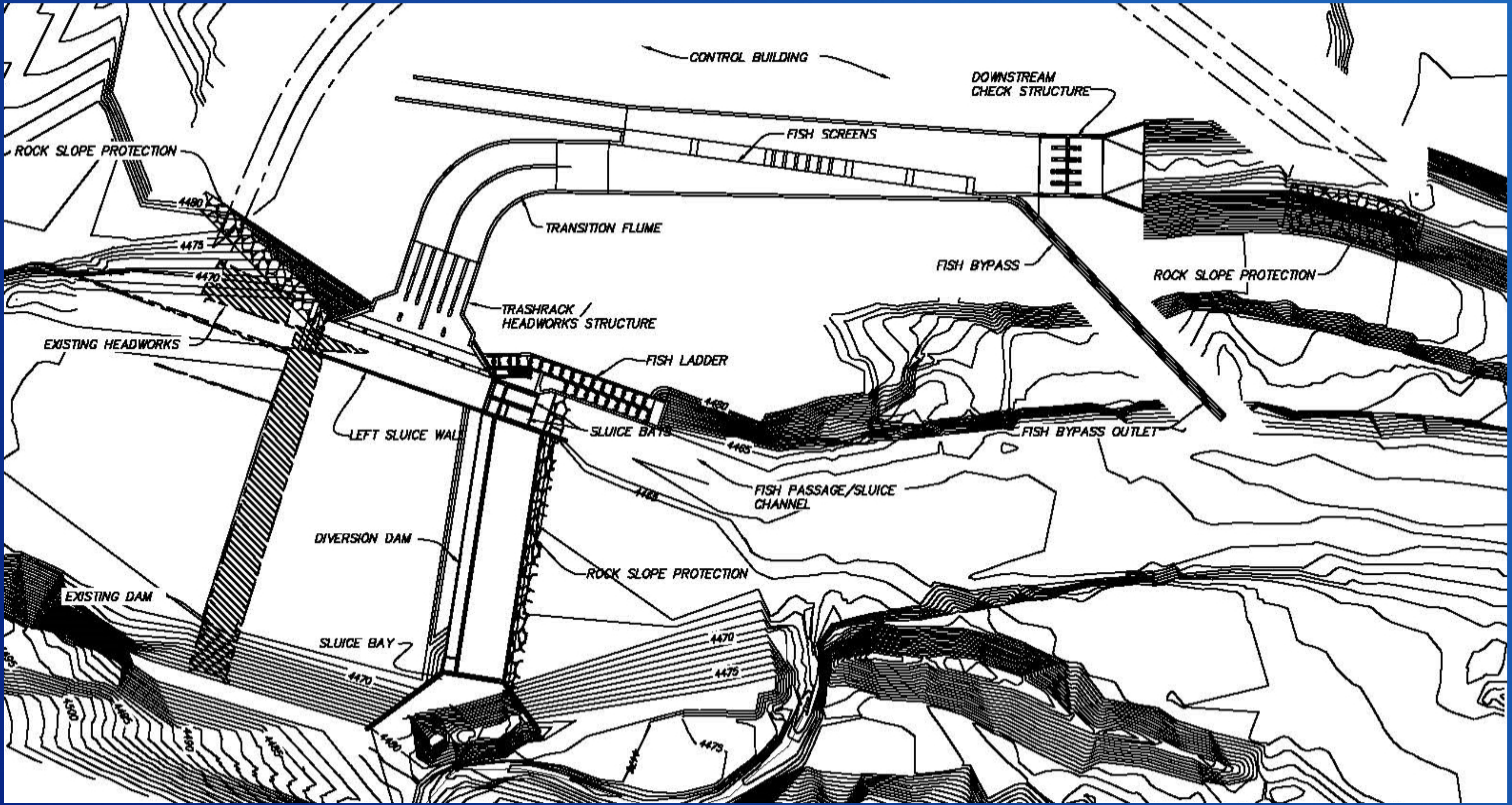
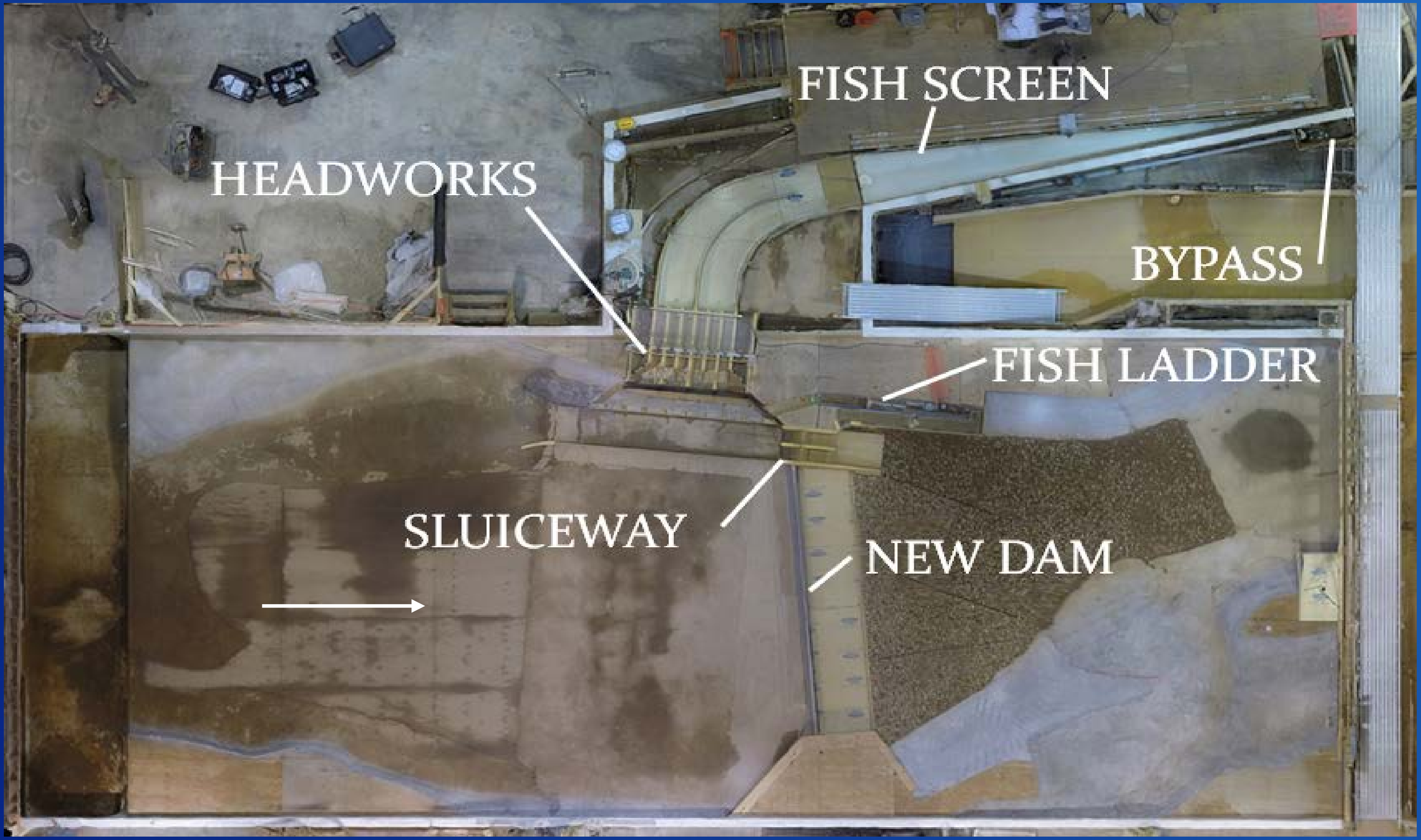
Reconfigured Model Plan View



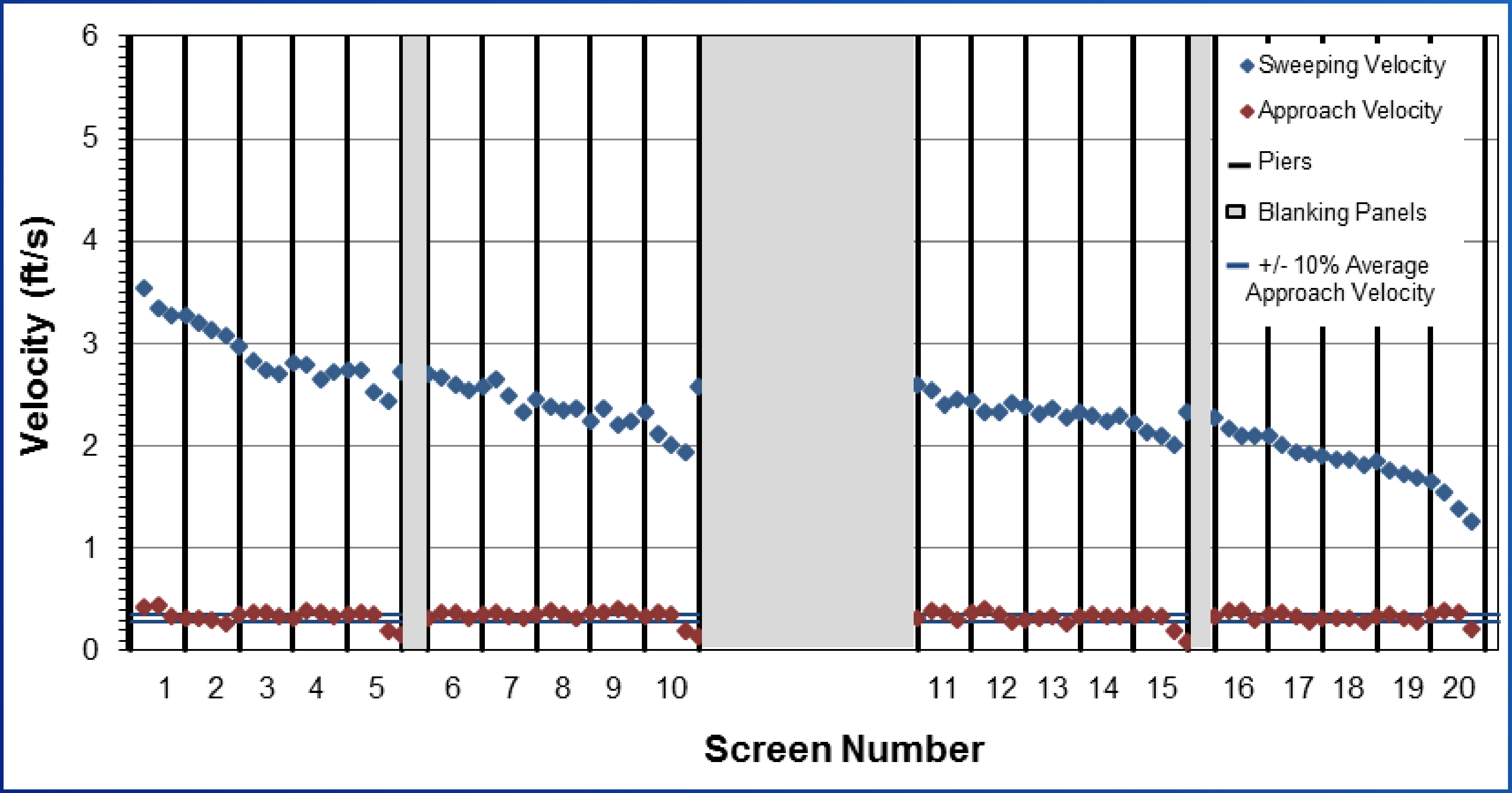
Aerial Photograph of Reconfigured Model



Relevant Study Criteria

- The approach velocity must not exceed 0.80 ft/s. Due to the absence of fry sized fish.
- Nearly uniform flow distribution over the screen surface. No individual approach velocity measurement exceeds 110% of the criteria.
- Screens must have sweeping velocity greater than the approach velocity.

Diversion Flow Rate of 650 cfs



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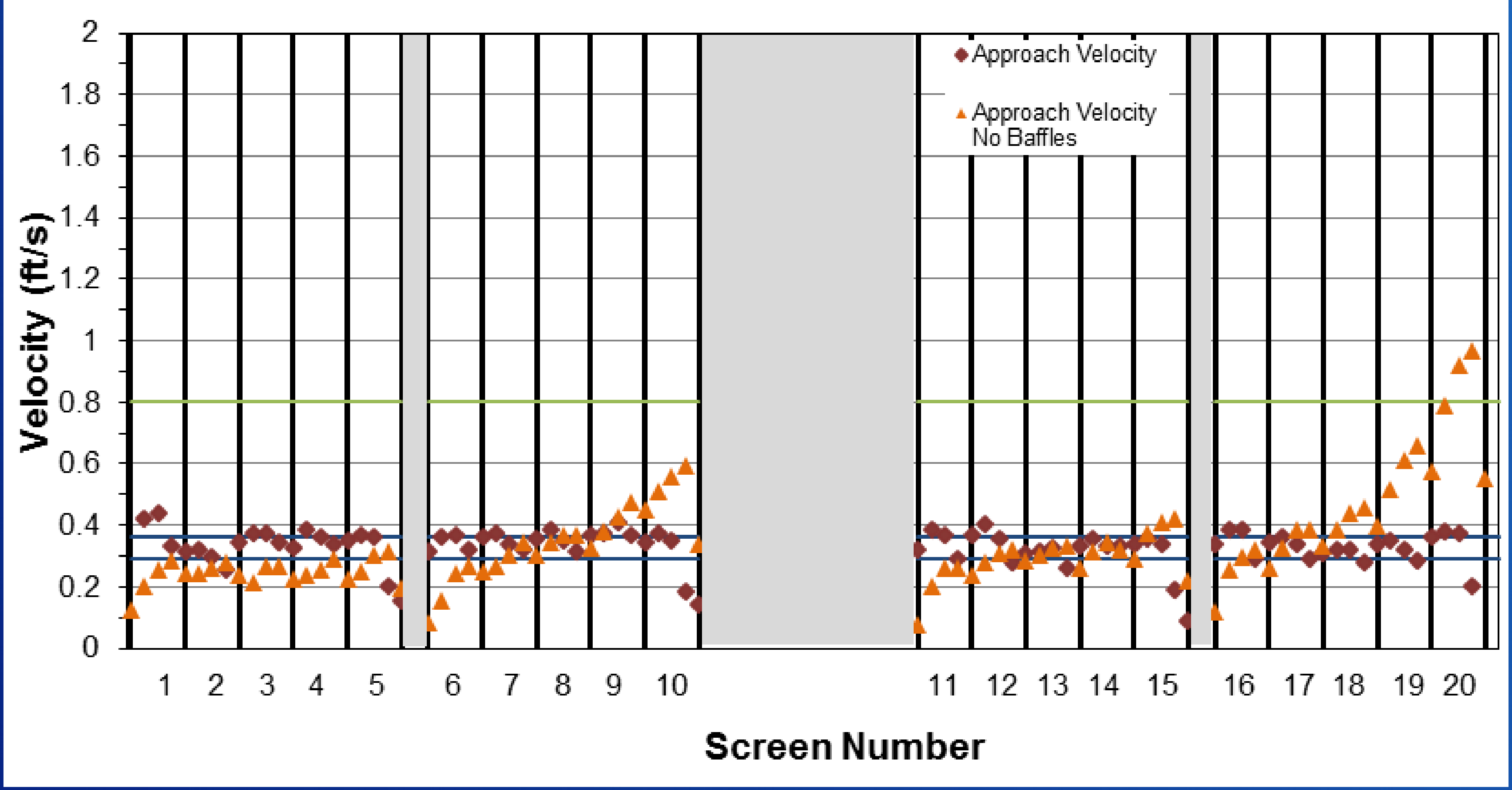
Approach Velocities at Diversion Flow Rate of 650 ft³/s



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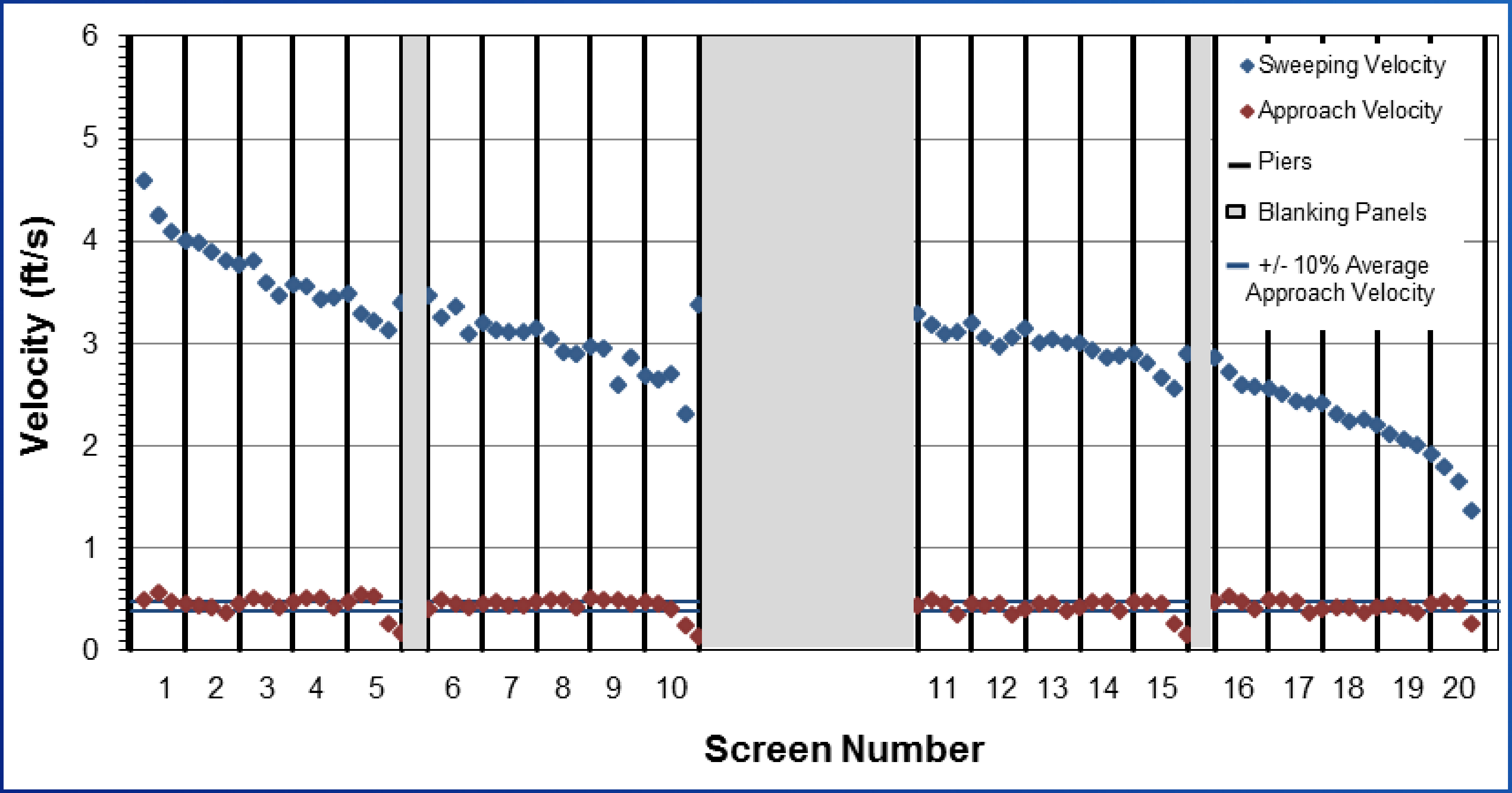
Diversion Flow Rate of 850 cfs



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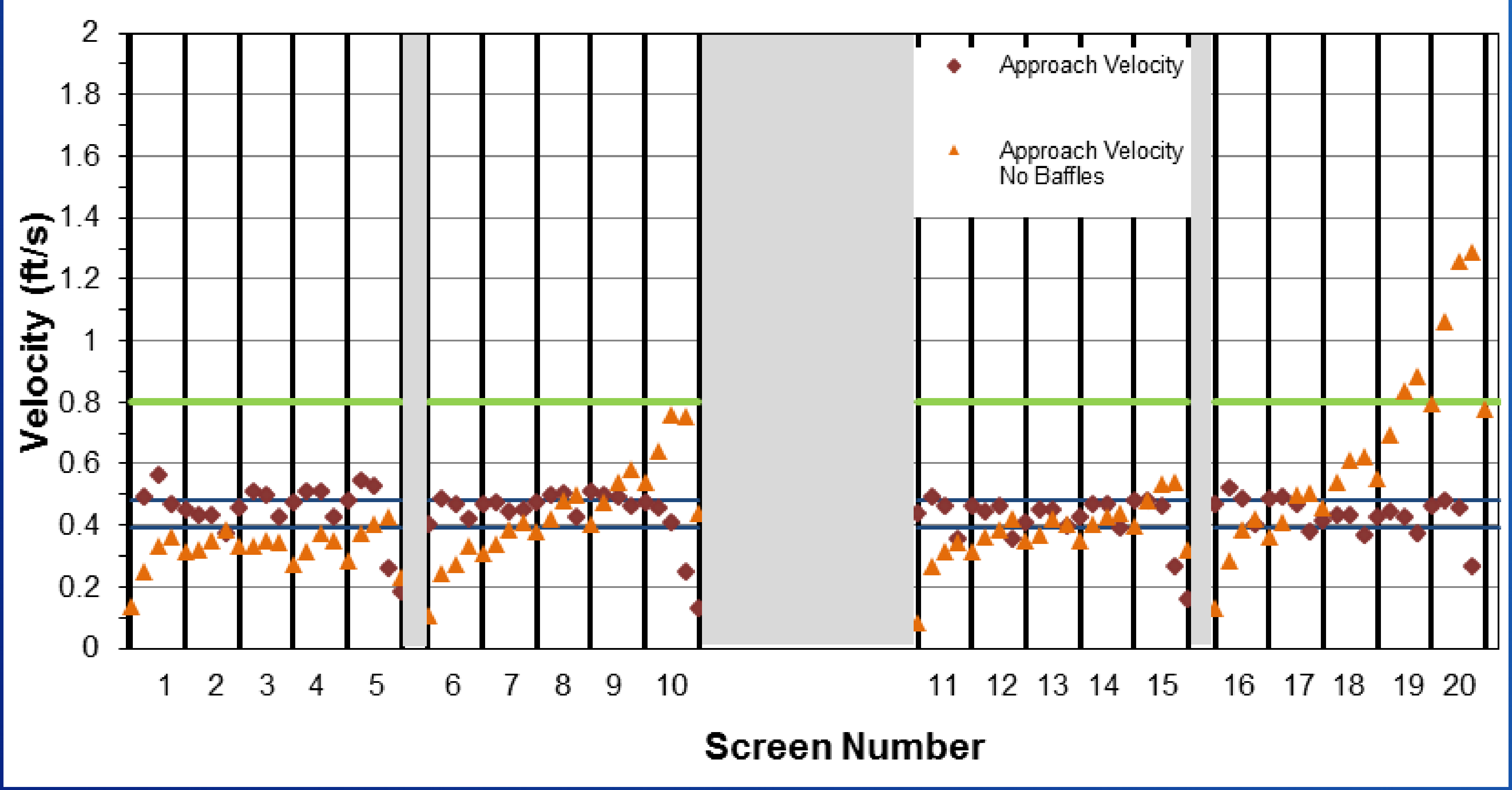
Approach Velocities at Diversion Flow Rate of 850 ft³/s



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Conclusions

- Replacement diversion dam to be located approximately 300 feet downstream of the existing diversion dam structure.
- Baffling was required to improve approach velocity distributions along the screen face, it was sufficient to provide approach velocities below screen criteria (0.8 ft/s).
- There were both eddying and recirculation along the upstream face of the fish screens. Due to the close proximity of the curvature between the headworks and fish screen.
- Headloss produced by the headworks and baffled fish screens were within an acceptable range to ensure canal discharges could be met with adequate canal depths.
- Confirm that all flow during non-irrigation season can pass through the sluice gates without inundating the headworks with water.

Thank you for your attention.

Easy to Answer Questions?

Difficult Questions:

- Please contact Bryan Heiner P.E.
- bheiner@usbr.gov

Arial Bold 36 Point

- First Level – Arial Bold 24 Point
  - Second level – Arial Bold 20 Point
    - Third level – Arial Bold 18 Point
      - Fourth level – Arial Bold 16 Point
        - Fifth level – Arial Bold 14 Point
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http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=E065 (photo)