Memorandums of Agreement – ADFG & ADOT – Fish Passage

Southeast Alaska Fish Habitat Partnership



Alaska Fish Passage Meeting Juneau, Alaska – October 13-14, 2015



Michael Daigneault Alaska Department of Fish and Game, Division of Habitat

Roadmap

- Distinction of the 2 fish passage agreements between ADF&G and ADOT
- Share details regarding components of the Design, Permitting, and Construction MOA
- Caution of what the Design, Permitting, and Construction MOA is NOT

Safe Passage MOA

- Commitment to safe passage for fish in all Alaskan waters
- Identifies statutory responsibilities for fish passage and our commitments under the Pacific Salmon Treaty
- Mutual agreement to:
 - Make technical resource information regarding safe fish passage available to the public
 - Meet annually to prioritize corrective actions to remove barriers to safe fish passage
 - Assess effectiveness of standards, construction techniques, and mitigation strategies test, refine, and apply new techniques to improve fish passage in Alaska





Design, Permitting, and Construction MOA What it IS

- Agreement between 2
 State Agencies
- Guidance for culvert design
- Establishes a process for project-specific culvert design discussions,
 including a starting point for discussion



Design, Permitting, and Construction MOA Background



- Fish require reliable passage to complete their life cycle
- State is committed to conservation of its fish resources and development of its transportation infrastructure
- Project design and permitting staff need consistent guidance



- MOA applies to new culverts and reinstallation during maintenance activities
- Any deviations from the MOA guidance will be agreed upon on a project-specific basis

Design, Permitting, and Construction MOA ADOT&PF Commitment

- Coordinate with ADF&G during earliest possible project phase
- Have all proposed fish passage
 structures reviewed by a Hydraulic
 Engineer for compliance with the
 MOA design criteria
- Provide ADF&G reasonable opportunity for field inspection





Design, Permitting, and Construction MOA ADF&G Commitment

- Identify fish-bearing waters that require fish passage
- Provide ADOT&PF with relevant fish passage information (e.g., design fish species/length, time of year passage is required)
- Timely approval of permit applications for culverts that comply with the MOA





Design, Permitting, and Construction MOA Mutual Commitments

- Apply the MOA design criteria
 - Ongoing research is providing insight into fish passage design
 - Annual review of design criteria amend to accommodate new info and techniques
- Follow established elevation procedures for any permit/MOA disagreements
- External policy and position announcements relating to this agreement may be made only by mutual consent
- Any data acquired or material published as a result of the MOA may be reproduced

Design, Permitting, and Construction MOA Exhibit A – Design Criteria

• MOA design criteria establishes a tiered approach that is designed to encourage stream simulation culverts



Design, Permitting, and Construction MOA Tier 1 - Stream Simulation Design Criteria

- Culvert width > 0.9 x OHW width; max width = 20 ft @ OHW
- In channel slopes < 1%, culvert width > 0.75 * OHW
- Culvert grade should approximate channel slope, with deviations up to 1% allowed; channel slopes < 6% (> 6% requires hydraulic analysis of streambed stability)
- Substrate material dynamically stable in flows \leq 50-yr flood
- If baffles are used, baffle height = 0.5 * culvert invert burial depth
- If aprons are used, apron length ~ 3 culvert widths
- Invert burial depth at least 40% of culvert diameter (at least 20% of the rise in arched pipes)

Design, Permitting, and Construction MOA Tier 2 - Fish Passage Design Criteria

- Combination of traditional hydraulic engineering and fish passage modeling
- FISHPASS or FISHXING (or both) modeling
- Evaluated for the design discharge for the fish, design flood hydraulic capacity, and effects on channel upstream/downstream
- Investigate treatments to address outlet perch or upstream headcutting
- Design flows = Q2D2; separate methods are identified for mainland AK and Southeast/Coastal AK; both rely on regional regression equations; numerous cautions regarding variability of calculations for SE AK (e.g., watershed size, underestimate of channel roughness, underestimate of wetted perimeter)
- Requires low flow evaluation minimum water depth = 2.5 x height of design fish caudal fin

Design, Permitting, and Construction MOA Tier 3 - Hydraulic Engineering Design Criteria

- Used when site-specific conditions preclude Tier 1 or 2
- No prescriptive design criteria
- Requires hydraulic engineering analysis to ensure appropriate fish passage conditions and detailed evaluation of hydrologic, hydraulic, and biological parameters
- Required for all baffled culverts at slopes > 10%; appropriate for culverts with tail water control

Design, Permitting, and Construction MOA Technical Notes





- Boundary roughness recommend 6 x 2 or 9 x 2.5 inch corrugations (up to 40% average velocity reduction); 3 x 1 inch corrugations discouraged
- Baffle spacing = 0.6 x culvert diameter; max baffle height = 0.15 x culvert diameter; notched, slotted, offset, or slanted design to concentrate flow
- Evaluate erodibility of bed material at outlet and apply appropriate treatment (e.g., rip rap) to avoid perching
- Skewed alignments may require hydraulic analysis of inlet conditions or boundary velocity to ensure fish passage

Design, Permitting, and Construction MOA Permit Procedures





- The proposed Tier design influences the required data and the complexity of fish habitat permitting
- Pre-application coordination
 between the agencies is required;
 design changes are easier and less
 costly during preliminary design;
 disagreements should be resolved
 prior to permit application
 submittal

Design, Permitting, and Construction MOA Lesser Known Exhibits

- Exhibit B Fish Passage Software (FISHPASS and FISHXing)
- Exhibit C specifies the permit application information
 requirements for each successive
 Tier
- Exhibit D defines various terms used throughout the MOA
- Exhibit E Literature Cited



Design, Permitting, and Construction MOA Interim Guidance, Cautions, Future Research

- Exhibit A guidelines based on best available Alaska information new info = amended culvert design guidelines (p.8)
- Formulas/models for estimating flood flows have varying degrees of error (p.8)
- Q2D2 was an interim fish passage design high flow incorporate temporal component (p.9)
- SE and coastal AK 40% of Q2 was interim value for fish passage design discharge evaluation flow regimes in the region (p.9)
- Range in recommended baffle heights (Powers 1993 vs. Tongass guidelines) (p.17)
- FISHPASS power/energy equivalents are inaccurate in culverts with slopes >3% (p.19)

Design, Permitting, and Construction MOA What it is NOT



• Plug and Play Gold-Standard Statewide Design Standard

Questions?

