#	Comment	Disposition
	Biological Review Team Comments on the Preliminary Draft Supplemental EA, June 2012	
1	There is little to no justification in the Supplemental EA for the proposed 0.9 foot increase of dam crest height.	The EA was revised and states the need for the raised weir crest is to provide sufficient water surface elevations to divert the appropriate flows through the bypass channel and for irrigation diversions. The weir height was determined through hydraulic analysis of the varying flow split scenarios.
2	The document acknowledged concerns that raising the dam may further aggravate passage, but it appears as this concern has been dismissed in the following sentence in the document "Hydraulics analysis indicates that flows will not significantly change across the weir compared to the current dam configuration." However, what is a significant change? A slight increase in hydraulics can be significant and to say no significant change would occur is likely inaccurate.	This section of the EA (p. 4-16) has been revised to address these comments.
3	Also, to offset crest height increase and to keep hydraulics "similar", the new dam would add length to the rock ramp. This additional length needs to be addressed in the document. The additional length at "similar" (yet greater) hydraulics has the potential to further aggravate existing in-river passage opportunities currently used by several species of fish.	The text has been revised to address this comment.
4	With no increase in dam height, at what discharge will irrigation be affected?	The lead agencies hope that the collaborative stakeholder meetings held the summer of 2013, and the alternatives explored and information shared at those meetings, have addressed these BRT comments.

5	How frequently is this condition expected to occur?	See response to Comment #4.
6	Is it feasible to mitigate these low-flow conditions with pumps or some other mechanism?	See response to Comment #4.
7	A cost analysis should be performed comparing supplementing low base-flow periods, when irrigation might be affected with no dam modifications, with pumps to better evaluate if the increased dam height and/or new dam is a cost-effective alternative.	See response to Comment #4.
8	Selection of a 15% flow split does not seem well justified as described in the draft EA. This decision appears to have been solely based on the possibility of sediment deposition occurring in front of the head gates.	The lead agencies recognize that a 15% flow capture design for the bypass channel is not the most favorable bypass option from a biological standpoint according to the BRT, but does aid in managing sedimentation issues and minimizing the height of the new weir. Thus, it is a compromise between providing higher bypass channel flows and the other issues. Please be aware that 15% is an average with bypass flows dependent on runoff and river stage.
9	Because 1) models are approximations of reality, 2) uncertainty was described to unusual lengths, 3) the model that predicted effective sediment transport at flow splits up to 30% was apparently disregarded, 4) the most conservative model (that we know was not accurately predicting the present condition and was based from conditions occurring about 40 miles downstream where the river goes through perhaps its largest geomorphological change) was used as the sole determinant of suitable flow splits, we request that additional criteria and considerations are taken into account when determining designed flow split.	The lead agencies took additional criteria and considerations into account in the revised design of the Bypass Channel Alternative.
10	Providing passage for pallid sturgeon (and all other fish species) is the purpose of this action. However, the decision appears to have been based primarily on irrigation efficiency by choosing a very conservative flow split at the expense of being generous about whether that flow split could effectively pass fish. We request that fish passage be given at least equal consideration.	The lead agencies re-evaluated the flow split, conducted additional analyses and determined that providing increased flows into the bypass channel would require increasing the height of the weir and increase the risk of sediment deposition in front of the new headworks.
11	More work should be done to determine how a larger flow split design can be achieved without causing sediment aggradation.	See response to Comment #10.
12	A sloped dam crest, i.e. higher on the east abutment and lower on the west abutment, if designed, could facilitate sediment transport. The channel will remain entrained on the west side of the river even at low flows, possibly minimizing sediment deposition in front of	Various notch configurations are being evaluated as the design progresses. A sloped crest can be considered if desired.

	the head gates (most deposition would occur on the inside east bend).	
13	Installation of a sluice gate on the west side of the dam to convey sediment could further minimize the possibility of deposition. The sluice gate could be run at all times irrigation is not occurring (~6 months of the year) which would eliminate built-up sediment and chronic channel instability. It could also be run during periods of high flow (~1-2 months of the year) when sediment transport is also highest because there would be enough water to achieve adequate head without fully impounding the river.	The lead agencies hope that the collaborative stakeholder meetings held the summer of 2013, and the alternatives explored and information shared at those meetings, have addressed these BRT comments.
14	Examination of additional alternatives such as these [above], in combination with consideration of both of the aforementioned models and their uncertainty, should occur. This additional analysis, collectively, could lead to development of reasonable alternatives that could support a greater flow split more conducive to fish passage.	See response to Comment #13.
15	The cost benefit analysis (appendix D) and FPCI model (appendix E) do not assess the direct or cost-adjusted benefits of providing larger flow splits. This affects the perceived benefits to both pallid sturgeon and other species in the fish assemblage. This model should be run at higher flow splits up to 30% and appendices D and E should be updated accordingly to allow for full analysis of the benefits of increased flow splits. We also made this request during review of this model several months ago and it did not occur.	See response to Comment #13.
16	The first is related to parameter Fl, which quantifies the ability of a fish to locate the passage alternative. The bypass is located on an outside bend with a fairly substantial velocity shear zone, which will negatively affect the ability of sturgeon to locate the entrance. This was not quantified, which makes the bypass appear better than it is.	Reclamation TSC is constructing a physical model to evaluate these concerns.
17	Also larger flow splits, which would increase Fs for the bypass channel and substantially improve its performance, were not modeled as noted above.	See response to Comment #13.
18	Interpretation of acres of habitat and cost effectiveness provided by passage alternatives should occur on two levels in appendix D and E: 1) pallid sturgeon and 2) all fishes. The difference between alternatives (ramp and bypass) when all species are considered is small; mostly because of values for non-sturgeon species. This small	See response to Comment #13.

	difference or similar performance between alternatives is primarily what is discussed. However, the ramp provides a larger relative benefit than the bypass for pallid sturgeon. Because pallid sturgeon are the primary reason this project is occurring, that should be given independent scrutiny. Analysis of larger flow splits should occur to determine when equal passage benefits between alternatives occur for pallid sturgeon.	
19	Table 3 of the adaptive management appendix implies that 12 years can go by while flows are incrementally adjusted from 15 to 23%. We question why 23% is not the starting point?	See response to Comment #13.
20	We also recommend that actual increases in bypass channel size up to 30% flow split be integrated into the adaptive management plan if not a component of the initial design.	See response to Comment #13.
21	In several places the term recruitment is misused, (i.e., p 3-3 "The 2011 runoff event in the Missouri River resulted in the first documented natural recruitment of wild, naturally spawned pallid sturgeon above Gavins Point Dam."; p 3-5 "This atypical run up the Missouri River resulted in the first documented natural recruitment of wild, naturally spawned pallid sturgeon above Gavins Point Dam. A naturally spawned pallid sturgeon was confirmed when a day old larvae was found upstream of Wolf Point Montana in the Missouri River (Fuller 2012).") The documentation of a larval pallid sturgeon confirms the first successful **spawning/reproduction;** not recruitment.	The text has been revised to reflect the accurate use of these terms.
22	P3-3, it states "Braaten et al. (2012) recently showed via a recapture study that pallid sturgeon originally released as free embryos and larvae can survive beyond the first year of life, indicating the importance and ability of the Yellowstone River and Missouri River to providing conditions that support survival, feeding, and growth of pallid sturgeon early life stages." As written this is misleading. Braaten and others did document survival of larval pallids that were released in the Missouri River. These fish would have been at or near the age when drifting slows or ceases (i.e. 11-17 days post-hatch). These fish were not released in the Yellowstone River so one should not suggest this. Perhaps rewording is in order.	The text has been revised to address these comments.
23	P3-5 Last paragraph, first few sentences Bramblett did not confirm but only speculated about spawning based on fish aggregations in	The text has been revised to address these comments.

	the lower 6-9 miles of the Yellowstone River. The author should cite more recent data from Fuller, or Jaeger, or others to articulate that known gravid (reproductive condition) fish were documented moving to Intake Dam.	
24	The figures for the adaptive management and monitoring may be low (i.e. 2-6 and 2-9). It may not be reasonable to assume that more than a hundred years of restricted passage and lack of recruitment due to impoundment can be "fixed" by simply "providing" a passage alternative. For a long-lived species such as a sturgeon, adaptive management may include a number of creative strategies for establishing or encouraging spawning aggregations above Intake. This may reasonably take decades. This potential for "delayed success" should be articulated to managers, stakeholders and the public. The recovery of sturgeon populations requires long-term investment and commitment to a comprehensive set of management actions directed at recovery. That expectation is needed at the outset.	The lead agencies appreciate this information. The Adaptive Management Plan focuses on uncertainties associated with alternatives proposed in the draft supplemental EA. Uncertainties related to spawning and ultimately species recovery are outside the scope of the Adaptive Management Plan for this specific project.
25	The monitoring plan for passage in Appendix J is minimal and provides mostly a positive or negative response of tagged fish to the structure without any causative or mechanistic explanation to why fish did or did not pass the structure. There is no discussion of reproductive evaluation or assessment of motivation of the fish to pass. Other than sturgeon, no native fish are included in monitoring. There is no comprehensive evaluation of native fish use of the proposed constructed side channel. Thus, native fish passage should be integrated into the 1) success criteria, 2) adaptive management plan, and 3) monitoring program. If current in-river passage of other species is compromised by reconfiguring the dam, then that should be addressed and formalized within this document to make sure that adaptations are provided to ensure native species passage.	The draft Adaptive Management Plan has been revised in response to this comment, and we welcome additional comments on the plan.
Environmental Protection Agency Comments on the Preliminary Draft Supplemental EA, June 2012		
1	New information regarding pallid sturgeon behavior that resulted in reevaluation of the Bypass Channel Alternative is not identified or discussed. We recommend that this new information be explained and described in greater detail, so the public can better understand	The text has been revised to address this comment.

	why the Bypass Channel Alternative is being reconsidered.	
2	We recommend that the draft EA explain why the bypass channel is proposed at its current location, and why the connection with the main river channel should not be moved further downstream (i.e., away from Intake Dam's turbulence).	The EA was revised to provide the following information: • "By locating the exit point at the downstream end of the dam, fish are thought to be more likely to find the bypass channel, and utilize it in their movement upstream." (p. 2-3) • "The critical point in upstream fish passage design is the location of the fish pass entrance and the attraction flow (Larinier 2001). The optimal location of a fish bypass entrance is near enough to the dam that the fish are guided into it as they look for a barrier-free pathway." (p. 4-7)
3	We recommend that the "sediment balance" issue that apparently constrains use of higher river flows in the bypass channel be more fully described in the EA, including discussion of trade-offs regarding bypass channel flows vs. pallid sturgeon use and sediment balance.	The lead agencies hope that the collaborative stakeholder meetings held the summer of 2013, and the alternatives explored and information shared at those meetings, have addressed these EPA comments.
4	Would relocation of the channel inlet further downstream from the dam as suggested in our comment #2 reduce sediment balance effects, and thus, allow a higher river flow, more attractive to pallid sturgeon, to be used in the bypass channel?	See response to Comment #3.
5	We also note that if a higher percentage of river flow in the bypass channel is more likely to attract and promote use of the bypass channel by pallid sturgeon, it would appear appropriate to direct a higher percentage of river flow through the bypass channel (e.g., 30-35% of river flow). Perhaps this would only need to be done before and during the May-June pallid sturgeon spawning season to encourage greater use by pallid sturgeon just before and during the spawning period. Flows through the bypass channel could then be reduced to 15% after spawning season, and thus, allow more flow in the main river channel during most of the irrigation season.	See response to Comment #3.
6	The draft Supplemental EA states that the design of the headworks requires that the crest of the dam be raised by approximately 1 foot to create additional head in order to operate effectively (page 4-14). It also states that a new dam (or river wide concrete weir) is proposed to be constructed 40 feet upstream of the existing dam crest in the future (page 2-6). It is not clear if this increase in height of the dam by 1 foot refers to raising the crest of the existing dam by	The elevations of the top of the existing Intake Dam timber crib (i.e., without rock) (1988.0) and proposed weir (1990.5) have been provided in the DSEA. Rock placement on the top of the existing timber crib is used to raise the elevation of the water surface. Given the variability of the large rock placed on the timber crib and its periodic displacement, it is difficult to provide a precise difference in operational elevations between the existing conditions and the

	1 foot or raising the crest of the new dam (or river wide concrete weir) by 1 foot, or both. This should be clarified.	weir proposed under the Bypass Channel Alternative.
7	In addition there is concern that raising the elevation of the existing dam and/or constructing an additional dam (or river wide concrete weir) 40 feet upstream of the existing dam with a slightly higher crest both may create new or additional impediments to fish passage in the main river channel for other Yellowstone River fish species.	The Bypass Channel Alternative weir design has been further refined to reduce potential impacts to fish passage.
8	We recommend that the potential for reducing wetland and riparian impacts continue to be evaluated and minimized while providing the best available option for sustaining pallid sturgeon.	It is our goal to minimize impacts to wetlands and riparian areas wherever practical. BMPs have been identified to address these concerns.
Fish and Wildlife Service Comments on the Preliminary Draft Supplemental EA, June 2012		
1	For consistency between sections, and for reasons identified specifically in several of the comments below, we recommend that the No Action be included under all resource categories in Chapter 4. In some cases, it may be appropriate to simply reference the analysis in the 2010 EA.	The No Action Alternative is contained in the 2010 EA, which will be provided electronically with the DSEA.
2	We noted several typographical errors (spelling, missing words, extra words, capitalization, etc.) throughout the document, but for the most part did not specifically identify these as part of our review and comment.	The document has been revised.
3	Chapter 1, Background Information, P 1-4: Recommend revisions as follows: "*Reclamation and the Corps remain committed to providing effective fish passage. Reclamation, the Corps, and the Service believe it is prudent to revisit both the rock ramp design and other fish passage alternatives,…*"	The lead agencies hope that the collaborative stakeholder meetings held the summer of 2013, and the alternatives explored and information shared at those meetings, have addressed these Service comments.
4	Chapter 1, Scoping, Issues, and Public Involvement, P 1-5: Since hydrology is a relevant fish passage issue, additional rationale/discussion should be provided in this section as to why hydrology is not addressed separately (i.e., under its own heading) in chapters 3 and 4, as it was in the 2010 EA.	The existing conditions of the hydrology has not changed since the 2010 EA nor have the impacts related to hydrology, therefore it is not necessary to include a specific hydrology section in the supplement. A hydraulics/geomorphology analysis is in included in the document. All hydraulics discussions are incorporated into the relevant sections of impacted resources as well as the Engineering Appendix (A2).
5	Chapter 2, No Action (Continue Present Operation), P 2-2: The statement, "This would include the annual placement of 1-2 feet of rock on the crest of the dam, using the existing cableway, to replace rock moved by ice and high flow events" is inconsistent	New information indicates that following some high flow years more rock placement may be necessary than originally anticipated. Rock placement is not necessary annually – only as needed.

	with the statement, "The design of the headworks requires that the crest of the dam be raised by approximately 1 foot to create additional head in order to operate effectively" on p 4-14 and the proposed 11-inch crest raising via rock placement described/ analyzed in the February 2012 Reclamation BA. This text should be made consistent with the Chapter 4 text and 2012 BA or further explained.	
6	Chapter 2, No Action (Continue Present Operation), P 2-2 (bottom): The difference between the annual O&M activities "rock placement on the diversion dam" and "diversion dam rehabilitation" should be briefly explained.	The text has been clarified in response to this comment.
7	Chapter 2, Bypass Channel Alternative, figure on P 2-4: We recommend that the two mid-channel vertical control structures (riprap sills) discussed on P 2-5 be included on this figure.	Figure 2.6 has been added to the document which shows the vertical control structures.
8	Chapter 3, Fish, P 3-1 and 3-2: Citation should be provided for statement, "*Currently Reinhold is looking into whether this trend is also true during base flows when runoff is not a factor*."	Statement has been removed from the DSEA.
9	Chapter 3, Fish, P 3-2: The statement that pallid sturgeon are not strong swimmers may not be completely factual. They have evolved in large rivers with strong currents and migrate long distances. We recommend the author articulate that the high turbulence, unnatural velocities at the dam, and downstream boulder field are conditions with which the species did not evolve and thus biologically is not equipped to readily negotiate. Also, this section should reference White and Mefford's 2002 research that further confirms shovelnose sturgeon, and thus likely pallid sturgeon, have a difficult time with high velocities and turbulent flows.	The text has been revised in response to this comment.
10	Chapter 3, Fish, P 3-2: The statement, "*Radio telemetry studies have documented pallid sturgeon moving up to the Intake Diversion Dam, turning around, and moving downstream (Bramblett 1996, Bramblett and White 2001; Fuller et al. 2008)*" should also cite the 2011 FWP / USGS telemetry study on the lower Yellowstone River.	The lead agencies have requested the appropriate citations for this telemetry data.
11	Chapter 3, Fish, P 3-3: First paragraph last sentence states, "*The 2011 runoff event …resulted in the first documented natural recruitment of wild…*" This is inaccurate. The documentation of a larval pallid sturgeon confirms the first successful **spawning/**	The text has been changed to reflect this comment.

	reproduction. However, reproduction means nothing if young do not survive to adulthood to reproduce again; this is **recruitment**.	
12	Chapter 3, Fish, P 3-3: The second paragraph states, "*On the lower Yellowstone River, bluff pools and terrace pools, which have relatively coarse substrates, are presumed to be a preferred spawning habitat for pallid sturgeon.*" We disagree with this statement. Pallid sturgeon spawning has been documented in these habitats in the lower Missouri and Yellowstone rivers, but we are not certain that these habitats within the lower Yellowstone River are preferred spawning habitats. Also, bluff pools and terrace pools should be briefly defined for non-technical readers.	The text was revised in response to this comment.
13	Chapter 3, Fish, P 3-3: Recommend revisions as follows: "*Hiebert et al. (2000) estimated that about 500,000 fish of 36 species were annually entrained into the main canal at Intake Diversion, of which as many as 8% were sturgeon*."	The text was revised in response to this comment.
14	Chapter 3, Fish, P 3-4: Recommend revisions as follows: "*Because the canal headworks at Intake has recently been rebuilt, and has incorporated removable rotating drum screens that meet screening criteria standards for minimizing entrainment, it is anticipated that entrainment is no longer a substantive issue*."	The text was revised in response to this comment.
15	Chapter 3, Fish, P 3-5, first few sentences of last paragraph: Bramblett did not confirm pallid sturgeon spawning in the lower 6-9 miles; this was speculated based on fish aggregations. We highly recommend the Supplement author look at more recent data from Fuller and others to articulate that known gravid (reproductive condition) fish were documented moving to Intake Dam. Then begin making the argument that the fish would likely have continued upstream had the barrier not been there.	The text was revised in response to this comment.
16	Also, remove "natural recruitment of" from the penultimate sentence (see comment above).	The text was revised in response to this comment.
17	This section also should mention the independent reviews related to larval drift in the Yellowstone River concluding that passage at the dam should increase drift distances.	The text was revised in response to this comment.
18	Chapter 3, Aquatic Invasive Species, P 3-4: Revise "confluents" to "confluence".	This correction was made to the text.
19	Chapter 3, Federally Listed Species and State Species of Special	The text was revised in response to this comment.

	Concern, P 3-5 (top): States, "*The Service, as required by the ESA, confirmed a list of federally-listed endangered, threatened and proposed species that are or may be present in the Intake Project area. The same species that were looked at in the 2010 EA were also considered under the new alternatives. Species status and biology can all be located in the 2010 EA. All species biology and status has stayed the same but new information has been obtained on pallid sturgeon since the release of the 2010 EA.*" It should be clarified that the Intake ESA species list was updated by Reclamation in their February 2012 BA. The 2012 BA list included pallid sturgeon, interior least tern, whooping crane, black footed ferret, and the candidate greater sage-grouse and Sprague's pipit. It should be clarified that the greater sage-grouse and Sprague's pipit were designated as candidates in 2010 (March and September, respectively). Neither species was assessed in the 2010 EA or 2010 BA as candidate species, although the Sprague's pipit was discussed as a species of special concern in the 2010 EA. Clarifying discussion should be added to this section.	
20	Chapter 4, Geomorphology, P 4-4, Figure 4.1: Recommend replacing "on" with "within" in figure title.	Change was made to title.
21	Chapter 4, Geomorphology, P 4-6, Figure 4.2: Recommend replacing "on" with "within" in figure title and eliminating "proposed" from the "New Headworks" and "Main Canal Extension" labels in the legend as these features have been constructed.	Change was made to title and legend was revised to remove "proposed".
22	Chapter 4, Geomorphology, P 4-7, 2nd paragraph under Bypass Channel Alternative: Recommend also including discussion of the proposed riprap sill at the downstream end of the channel.	The text was revised in response to this comment.
23	Chapter 4, Geomorphology, Rock Ramp Alternative, Cumulative Effects and Summary, P 4-8: States, "*The Bypass Channel Alternative would increase the length of stabilization features on the Lower Yellowstone River by about 20% in the reach from Cartersville Dam to the confluence of the Missouri River. The Rock Ramp would provide a minor increase of 1.6% in the length of stabilization on the Lower Yellowstone River from Cartersville Dam to the confluence of the Missouri River.*"	The text was revised in response to this comment.

	However, the Summary states that the Bypass Alternative would add 1,400 feet of bank stabilization, while the rock ramp alternative would add 2,899 feet of bank stabilization – double that of the Bypass Channel Alternative. This discrepancy should be clarified or corrected.	
24	Chapter 4, Surface Water Quality, Bypass Channel Alternative, P 4-9: States, "*Because the Bypass Channel Alternative would not affect river flows, point source discharges, or non-point source discharges after construction, all water quality effects would be temporary.*" The bypass channel would affect river flows post-construction, in that it is designed to carry and reduce the mainstem flow by approximately 15% (over the affected segment). This should be discussed / addressed.	Sentence has been changed to say "Because the Bypass Channel Alternative would not affect cumulative river flow quantity, point source discharges, or non-point source discharges after construction, all water quality effects would be temporary".
25	Chapter 4, Aquatic Communities, Fish, Bypass Channel Alternative, P 4-14: Recommend revision as follows: "*At a 15% flow capture design, the bypass channel is not optimal.*" Also, this statement should be further explained and discussed since the BRT is seeking higher (30%) flows; indicate from an engineering standpoint why the 15% recommendation might not work. The ongoing design process should strive to incorporate BRT flow split recommendations to the maximum extent possible. Additional analysis should be performed as necessary to determine how a larger flow split design can be achieved without causing sediment aggradation at the headworks.	The text was revised in response to this comment.
26	Chapter 4, Aquatic Communities, Fish, Bypass Channel Alternative, P 4-14: The statement, "*Hydraulics analysis indicates that flows will not significantly change across the weir compared to the current dam configuration*" should be further explained / quantified. How much are flows predicted to change?	The text was revised in response to this comment.
27	Chapter 4, Aquatic Communities, Fish, Bypass Channel Alternative, P 4-14: States, "*In addition, the removal of any metal components utilized in the construction of the new weir will take place*." It is unclear whether this means that metal components will be removed from the new design, or that metal components in the existing weir would be removed. Further, the sentence, "*Therefore, there will not be significantly more metal after*	The text was revised in response to this comment.

	construction of the weir than currently exists within the existing dam that could be considered problematic for fish that are electroreceptive…" implies that there will be more metal post-construction than currently exists. This discussion should be clarified.	
28	Chapter 4, Aquatic Communities, Fish, p 4-11 through 4-16: For the action alternatives, temporal impacts of not providing fish passage for the 2-3 year period between summer 2012 and anticipated passage alternative completion dates should be discussed. For the No Action alternative, the short and long-term impacts of not providing fish passage, and potentially further impeding or eliminating fish passage, should be discussed. The additional 11 inches of rock placed on the dam in 2012 in order to achieve sufficient hydraulic head at the new headworks incrementally decreased potential fish passage for several species. The No Action alternative would seemingly have the greatest impact to fish in this regard (in that passage potential was further decreased, with no proposed remedy incorporated into the alternative), but is not currently analyzed in the EA.	The lead agencies believe this is adequately addressed in the 2010 EA.
29	Chapter 4, Federally-Listed Species and State Species of Special Concern, Introduction, P 4-16: "BiOp" should be replaced with "2003 amended Missouri River Biological Opinion"	The text was revised in response to this comment.
30	Chapter 4, Federally-Listed Species and State Species of Special Concern, Introduction, P 4-16: Recommend revision as follows: "*Provided an action alternative is selected, this project constitutes implementation of an RPA, and Endangered Species Act section 7 consultation on its construction is therefore concluded. However, the operations of the Intake Project by Bureau of Reclamation, including operation of the new headworks in conjunction with the implemented (selected) fish passage design, requires a separate but parallel section 7 consultation. This parallel effort will likely require formal section 7 consultation with the Service. This future BA on operations will be completed prior to the actual operation of the selected fish passage alternative.*"	The EA was revised to provide the following information: "While Section 7 consultation for a fish passage project has been concluded, the operations of the Intake Project by Bureau of Reclamation, including operation of the new headworks in conjunction with the implemented (selected) fish passage design, requires a separate but parallel Section 7 consultation. This parallel effort will likely require formal Section 7 consultation with the Service. This future BA on operations will be completed prior to the actual operation of the selected fish passage alternative." (p. 4-18)
31	Chapter 4, Federally-Listed Species and State Species of Special Concern, Methods, P 4-16/4-17: Again, it should be clarified that the Intake ESA species list was updated by Reclamation in	The text was revised in response to this comment.

	their February 2012 BA.	
32	Chapter 4, Federally-Listed Species and State Species of Special Concern, Short Term and Long Term Effects of the Alternatives, P 4-17: The No Action alternative should be addressed. The short and long-term impacts of not providing fish passage for pallids, and potentially further impeding or eliminating fish passage for other species of concern, should be discussed (see comment above).	The lead agencies believe this is adequately addressed in the 2010 EA.
33	Chapter 4, Federally-Listed Species and State Species of Special Concern, Short Term and Long Term Effects of the Alternatives, Federally-Listed Species (both action alternatives) P 4-17/4-18: Brief rationale for the effect determinations for the whooping crane and least tern should be provided. For consistency with the February 2012 BA, the black-footed ferret, greater sage-grouse, and Sprague's pipit should also be addressed in the discussion. Also, determinations should be consistent with those made for the Rock Ramp alternative (on P 4-18).	The text was revised in response to this comment.
34	Chapter 4, Federally-Listed Species and State Species of Special Concern, Short Term and Long Term Effects of the Alternatives, Federally-Listed Species, Bypass Channel, P 4-17: States, "*Incidental take of pallid sturgeons during construction are considered in the original Missouri River BiOp, with reasonable and prudent measures to avoid take being associated with each RPA element.*" This is true for the RPAs considered in the original 2003 amended Missouri River Biological Opinion. However, anticipated incidental take associated with the Intake project construction was not specifically addressed in the 2003 amended Missouri River Biological Opinion nor the 2009 Service letter that substituted the RPA element at Intake Dam and its irrigation headworks for that originally identified to be taken at Fort Peck Dam. Based on the analysis and environmental commitments identified in the 2010 Intake project construction BA, EA, and FONSI, such take was not anticipated. Provided new information does not emerge during the amended EA analysis indicating that take may occur, and conservation measures and environmental commitments identified in the 2010 BA, EA, and FONSI will remain in place or undergo revision with Service approval, the	The text was revised in response to this comment.

	Service does not currently anticipate incidental take in conjunction with fish passage project construction. The explanation in the EA should be clarified accordingly.	
35	Chapter 4, Federally-Listed Species and State Species of Special Concern, Short Term and Long Term Effects of the Alternatives, Federally-Listed Species, Rock Ramp, P 4-18: Brief rationale for the effect determinations for the whooping crane and least tern should be provided. The pallid sturgeon discussion should be to a similar depth of discussion as it was under the Bypass Channel, or specifically referenced from the 2010 BA, EA, etc. For consistency with the February 2012 BA, the black-footed ferret, greater sage-grouse, and Sprague's pipit should also be addressed in the discussion. Also, determinations should be consistent with those made for the Bypass Channel alternative (on P 4-17).	The text was revised in response to this comment.
36	Chapter 4, Federally-Listed Species and State Species of Special Concern, Short Term and Long Term Effects of the Alternatives, Federally-Listed Species, Actions to Minimize Effects, P 4-19: Due to its larger footprint and potential for affecting a variety of habitat types, the Bypass Channel alternative may warrant additional commitments beyond those originally proposed for the Rock Ramp. These may include channel excavation sequencing to minimize sedimentation and fish entrainment potential, nesting bird construction timing considerations, and replacement / restoration of wetlands, riparian areas, and other habitats etc. Such measures specific to the Bypass Channel alternative should be considered as necessary in the EA.	Best Management Practices and other measures specifically addressing the effects of the Bypass Channel Alternative are included in the DSEA and Appendix I.
37	Chapter 4, Recreation, Short Term and Long Term Effects of the Alternatives, Fishing, P 4-21: The No Action alternative should be addressed. The short and long-term impacts of potentially further impeding or eliminating fish passage for game fish should be discussed (see comments above).	The No Action Alternative is contained in the 2010 EA, which will be provided electronically with the DSEA.
38	Chapter 4, Recreation, Short Term and Long Term Effects of the Alternatives, Fishing, last paragraph, P 4-22: Recommend revision as follows: "*Permanently closing the boat launch ramp under the Rock Ramp Alternative would result…*"	This change was made to the text.
39	Chapter 4, Social and Economic Conditions, Results, Short Term and Long Term Effects of the Alternatives, P 4-26: The No Action	The No Action Alternative as it relates to socioeconomic conditions is contained in the 2010 EA, which will be provided electronically

	alternative should be addressed. The short and long-term economic impacts of not implementing the RPA and resulting potential regulatory implications, costs, water delivery issues, etc. should be discussed at least in general terms.	with the DSEA. Chapter 4 of the DSEA contains supplemental No Action Alternative socioeconomic information for comparative purposes.
40	Chapter 4, Social and Economic Conditions, Results, Short Term and Long Term Effects of the Alternatives, Cumulative Effects, P 4-32/33: States, "*Based on Reclamation's experience with Section 7 consultation and ESA compliance on other projects and facilities, the Service would likely require that improved fish passage and entrainment minimization be in place by a certain date*." Entrainment minimization is already in place and therefore should be removed from this sentence.	This correction was made.
41	Chapter 4, Lands and Vegetation, Results, Short Term and Long Term Effects of the Alternatives, Wetlands, P 4-34/35: It appears that deepwater (rock bottom or unconsolidated bottom) riverine habitat is lumped together with wetlands for purposes of this analysis as "riverine wetland" in portions of the discussion under both action alternatives, which leads to unclear and likely exaggerated projected wetland impact discussion, and may confuse any wetland mitigation aspects of this project. Projected impact acres of wetland verses non-wetland deepwater riverine habitats should be clearly discussed and provided for each alternative for comparison purposes. To avoid confusion, non-wetland riparian area impacts should be discussed exclusively under Riparian Areas.	The text has been revised in response to this comment.
42	Chapter 4, Lands and Vegetation, Results, Short Term and Long Term Effects of the Alternatives, Riparian Areas and Woodlands, P 4-35: It is unclear from the discussions under these headings whether woodlands are inclusive of riparian areas – this should be clarified in the discussion.	The text has been revised in response to this comment.
43	Chapter 4, Lands and Vegetation, Results, Short Term and Long Term Effects of the Alternatives, Noxious Weeds, No Action Alternative, P 4-36: This section references "what already occurs", but should provide a description of what this means. For example, is there ongoing weed treatment? No treatment? Are weeds an ongoing issue?	The text has been revised in response to this comment.
44	Chapter 4, Lands and Vegetation, Results, Actions to Minimize	The text has been revised in response to this comment.

	Effects, Wetlands, P 4-38, 2nd bullet, Suggested revision as follows: "*Discharges of fill material associated with unavoidable impacts to wetlands or intermittent streams…*"	
45	Chapter 4, Lands and Vegetation, Results, Actions to Minimize Effects, Wetlands, P 4-38, 4th bullet, Suggested revision as follows: "*…and will suggest actions to minimize and mitigate effects to wetlands*.	The text has been revised in response to this comment.
46	Chapter 4, Wildlife, Results, Short Term and Long Term Effects of the Alternatives, Bypass Channel Alternative, P 4-40, Mammals & Birds sections: States, "*The excavated bypass channel would impact approximately 73 acres of mixed habitats, including wetlands, riparian areas, woodlands and grasslands*." However, previous discussion under these headings implies permanent and temporary impacts 1 ac of emergent wetland, 13 ac of riparian, 32 ac woodlands (channel), 51 ac woodlands (borrow), 20 ac grasslands (channel), and 153 ac grasslands (waste pile). We are not able to discern where the 73 ac originates. This should be clarified/ corrected. This is also very inconsistent with the Summary, which concludes, "*Based upon the total construction footprint, the Bypass Channel Alternative would have the most impacts (over 626 acres)*."	In writing the EA, acres of impacts were calculated for "affected area", or the area in which the overall project is taking place and impacts are likely to be within. In addition, we track temporary direct impacts associated with temporary construction features (staging areas, haul roads, etc) as well as permanent direct impacts, which are impacts from features that will permanently change the area in which they occur were tracked separately for each resource category. That being said, it appears the reader has tried to add up specific permanent and temporary impact acreages to get the "affected area" acreage. This calculation would be in error, as the affected area is only the area in which impacts may potentially occur, and not the total area of direct impact. Also, the analysis for each of the resource categories may be confusing to the reader, as resources types sometimes overlap. For example, "Forested Wetlands" impacts in the wetlands analysis may overlap with impacts to "riparian forest" in the vegetation analysis. These are separate analyses, and are not additive. They simply help to provide perspective to how this activity may impact categories of resources within the overarching resource type.
47	Chapter 4, Wildlife, Results, Short Term and Long Term Effects of the Alternatives, Bypass Channel Alternative, Birds, P 4-40: Should include a discussion of potential impacts to nesting birds in affected habitats during construction.	The text has been revised in response to this comment.
48	Chapter 4, Wildlife, Results, Short Term and Long Term Effects of the Alternatives, Rock Ramp Alternative, P 4-41: States, "*…a limited amount*" of vegetation would be impacted. An estimate of impacted acreage should be provided to facilitate comparison	The text has been revised in response to this comment.

	between alternatives.	
49	Chapter 4, Wildlife, Results, Short Term and Long Term Effects of the Alternatives, Rock Ramp Alternative, Amphibians and Reptiles, P 4-41: States, "*Rock Ramp construction activities would have a temporary effect on amphibians and reptile species located in the immediate vicinity of the construction area, similar to the impacts described for the other action alternative*." However, no discussion of amphibians and reptiles was provided for the Bypass Channel Alternative.	A section on Amphibians and Reptiles has been added for the Bypass Channel Alternative. (p. 4-46)
50	Chapter 4, Wildlife, Results, Summary, P 4-41: States, "*Based upon the total construction footprint, the Bypass Channel Alternative would have the most impacts (over 626 acres)*." Previous discussion indicated 70 total ac riparian, 184 total ac woodlands, and 321 total ac grasslands within the construction footprint (total of 575 ac). Also, the previous discussion on p 4-40 indicated only 73 ac of impacts to these habitats (see previous comment). Further, this Summary section states that the Rock Ramp would result in 28 ac of impacts, while previous section discussions total 5 ac riparian, 12 ac woodlands, and 21 ac grasslands (total 38 ac). All of these vegetation community / wildlife habitat discussions need to be examined for consistency and accuracy and corrected as necessary.	See response to Comment #46.
51	Chapter 5, Endangered Species Act Consultation, P 5-3: Suggested revision as follows: "*…in the Service's 2003 amended Missouri River Biological Opinion to the Corps.*"	The text has been revised in response to this comment.
52	Chapter 5, Migratory Bird Treaty Act and Executive Order 13186, P 5-6: MBTA is described, but EO 13186 is not. A description of EO 13186 should be included in this section.	The text has been revised in response to this comment.
53	Chapter 5, Biological Review Team, P 5-2: We recommend listing both Matt Jaeger and Jason Rhoten and indicating that Jason Replaced Matt with the effective date.	The list has been updated.
54	Chapter 5, Distribution List, U.S. Fish and Wildlife Service, P 5-12: Please substitute Jeff Berglund for Lou Hanebury in this list.	This change was made to the list.
55	Chapter 5, Distribution List, State Agencies, P 5-12: The Director of Montana Fish, Wildlife and Parks is Joe Maurier.	The text was updated to indicate that Jeff Hagener is the current Director of Montana Fish, Wildlife and Parks.

1	Corps unilateral decision that a bypass channel is the only option moving forward. Revisiting or at least discussing and rescoring other alternatives were minimized.	Reclamation and the Corps recognized the State and other stakeholders had significant concerns about the alternative identification process. In response, Reclamation hosted a series of meetings during the summer of 2013 to re-engage stakeholders in exploring alternatives for fish passage. This process is documented in Appendix A.1.
2	Biop changes that obviate the Corps from further pallid recovery efforts on the Yellowstone River or Missouri River at Ft Peck after a bypass channel is built is objectionable.	The lead agencies acknowledge the State's concern; this comment is outside the scope of the NEPA process.
3	Addressing all the uncertainties associated with the bypass channel on "adaptive management" is unacceptable when no agency is currently held responsible for adaptive management in writing. Funding realities for any of these adaptive management practices are not certain.	Reclamation has agreed to be responsible for implementation of adaptive management measures necessary to achieve fish passage, and intends to sign a Memorandum of Agreement that commemorates this responsibility. Funding sources for adaptive management measures hinges on a number of factors including applicable laws, regulations, and policies; total costs; the nature of the adaptive management measure; and likely other circumstances unknown until the specific measure is identified.
4	Language needs to be provided throughout the EA that describes who will be responsible for all the adaptive management actions. In multiple meetings the State has been assured that the BOR has verbally committed to taking on the responsibility for adaptive management and O&M. If this is true the EA needs to provide the statutory requirements that all expenses incurred by the BOR at Intake, even for the adaptive management of the bypass channel, have to be passed on to the irrigation district. The irrigation district should be provided an accurate estimate of annual O&M including realistic projections of adaptive management costs they will be responsible for reimbursing the BOR for upon completion of the bypass channel. Include statutory requirement in response and add where it is located in the document.	Text responding to this comment has been provided in Chapter 2 of the draft supplemental EA.
5	Basis for moving forward with the project is primarily driven by a business decision, not biologic criteria. This is supported by language in the EA that states the Rock Ramp outscores the Bypass Alternative in providing fish passage for pallid sturgeon and other fish communities, but the bypass alternative is superior because it is	Additional information has been included in the Chapter 2 – Preferred Alternative section describing the factors the lead agencies have considered in selecting the preferred alternative, including: the fish passage connectivity index results, constructability, ice forces, cost effectiveness, pallid side channel use, risk, and uncertainty.

	cheaper to construct (pg 4-19, 4-20 and A.1 -33).	
6	In meetings with the Corps FWP has been told that the rock ramp alternative is not a reality because of engineering limitations and more specifically costs. We have also been told that entertaining other alternatives is not an option. These realities need to be clearly articulated in the supplemental EA. As currently wrote, the reasons for picking the Bypass Channel distract readers from these two primary realities. FWP still prefers the Rock Ramp alternative and potentially other options over the bypass alternative.	Please see response to Comment #5 above.
7	Fish monitoring for the eight year period following construction and the associated annual cost is confusing. The states proposed monitoring and associated costs do not correlate to the cost provided in the EA?	Cost estimates were developed by the interagency team including MFWP, FWS, Reclamation, and the Corps. These are preliminary numbers that will need to be updated once monitoring requirements are finalized.
8	Add an index at the front of the EA that covers the entire document.	An index has been added to the document.
9	Pg iii fourth paragraph, add reasons why the reevaluation is necessary, including the new information that has become available regarding the rock ramp since the 2010 EA and FONSI. Pg i similar statements.	Specific information on the need to reevaluate fish passage alternatives has been provided in the Chapter 1 – Background Information section, and touched on in several other places in the DSEA.
10	Pg iii directs readers to Appendix A. Pg A.1-11. The bypass was never considered a Priority 1 alternative not even a Priority 2 alternative. How have we got here and why?	The lead agencies used past information and consultation with cooperating agencies to initially identify the bypass channel as a suitable alternative for consideration. Reclamation undertook additional collaborative alternative identification efforts during the summer of 2013, which concluded, when all factors were considered, the bypass channel and rock ramp were the best alternatives for detailed analysis.
11	Pg iv: The actual dam height increase (in feet) needs to be presented for the reader– we have been told in meetings that the dam will be 2 feet higher than the old dam.	The elevations of the top of the existing Intake Dam timber crib (i.e., without rock) (1988.0) and proposed weir (1990.5) have been provided in the DSEA. Rock placement on the top of the existing timber crib is used to raise the elevation of the water surface. Given the variability of the large rock placed on the timber crib and its periodic displacement, it is difficult to provide a precise difference in operational elevations between the existing conditions and the weir proposed under the Bypass Channel Alternative.
12	Pg 2-1 states “Because entrainment protection has been achieved through the ……”. This has to be confirmed with sampling, simply building it does equate to entrainment protection.	Language in the DSEA has been changed to reflect this concern.
13	Pg 2-3: Second to last sentence in first paragraph reads “A concrete	This change was made throughout the document.

	weir would be ……to provide adequate water surface elevations for water diversion into the new bypass channel." The words "and irrigation canal" must be added.	
14	Pg 2-6, the last paragraph before the Rock Ramp Alternative title has multiple issues: 1) all the cost figures do not match those provided in Table 2 Appendix E (Bypass Channel 15% Diversion, Weir 2 Alternative). For example the O&M provided on pg 2-6 is $138,000, Table 2 shows $220,216; 2) another sentence should identify that all costs will be covered by Corps except the O&M which will be the BOR responsibilities. Could reference this fact by citing Table 1 Appendix J.	The O&M costs for each of the alternatives have been updated with the most current information. Additional language is provided indicating the contract between LYIP and Reclamation for reimbursement of O&M costs would likely need to be amended if an action alternative is implemented.
15	Pg 2-6, the Rock Ramp Alternative should be removed from the Supplemental EA since it is not an option.	The Rock Ramp Alternative has been retained to provide the public and decision-makers with comparative information on a range of reasonable alternatives, which was also the approach agreed to by participants in the summer 2013 collaborative meetings.
16	Pg 2-7 remove "be" from the following "This concrete weir would be replace an existing….".	Correction was made.
17	Pg 2-9 define(s) the numbers for "….characteristics that meets the swimming abilities of pallid….".	The text has been changed to identify the BRT criteria as the standard for design.
18	Pg 2-10 , the third full paragraph has multiple issues: 1) all the cost figures do not match those provided in Table 2 Appendix E (Original Rock Ramp with Crest 2 Alternative). For example the O&M provided on pg 2-10 is $199,000, Table 2 shows $282,028; 2) another sentence should identify that all costs will be covered by Corps except the O&M which will be the BOR responsibilities. Could reference this fact by citing Table 1 Appendix J; 3) the last sentence says bypass channel, this should say rock ramp.	Please see response to Comment #14.
19	Pg 2-11: last paragraph states "…..the bypass channel is more efficient at providing fish passage benefits", this is contradictory to what is said in the first paragraph on 4-19 "Although the scores are close (both alternatives), the benefits for the bypass channel are slightly less favorable than the Rock Ramp Alternative." This last sentence needs to be included on pg 2-10 under Identification of the Preferred Alternative section.	Efficiency refers to the cost and benefit information for providing fish passage, whereas the second sentence cited refers to fish passage connectivity scoring. Information about both is discussed in the Chapter 2 – Preferred Alternative section.
20	Pg3-2 states 52 species in Yellowstone River then next sentence begins with say 54 species in the Yellowstone.	The information has been corrected.
21	Pg 3-2, "Garvey, personal communication, 2012" appears to be	This information has been added.

	missing from literature cited list.	
22	Pg 3-3 referenced “Deloney et al 2009” should be Delonay	This information has been corrected.
23	Pg 3-3 states “Of the current population of pallids within RPMA2, a large majority of fish tend to utilize the Yellowstone River during June/July with the exception of 2011” Statement should be further clarified. Missouri has altered hydrograph but experienced flows (similar to Yellowstone) in 2011 and approximately 40% of pallid sturgeon utilized the Missouri River above the confluence.	This section has been heavily revised and captures these suggestions.
24	Pg 3-3 It has been documented multiple years that pallid sturgeon have migrated up to and did not pass Intake. It has only 2008 as a reference year however this behavior has been documented multiple years	This information has been added.
25	Pg3-3 Fuller et al 2012 is referenced multiple times on the document but is not provided in Literature cited.	This has been corrected.
26	Pg 3-4 add sentence to end of first paragraph that explains that the BOR will sample the Intake Canal in 2013 & 2014 to demonstrate the assumed level of reduced entrainment.	This information has been added.
27	Pg 3-4 Whirling disease has not been verified at the Miles City hatchery. One sample was suspect of whirling diseases but repeated test did not detect its presence. The first test was determined to be a false positive.	This information has been corrected, and information on iridovirus has also been added.
28	Pg 3-6 states “While spawning is suspected to have occurred in the Yellowstone River, there is no evidence that any resulting young were hatched, ….” Braaten Rhoten 2012 captured genetically confirmed pallid sturgeon embryo in Yellowstone River. Pg A.1-4 similar statement,	This information has been corrected.
29	Pg 3-6 and A.1-4 states “While in most years it appears that sturgeon migrate up the Yellowstone, during the 2011 spawning season, the opposite was true,…..” This is a **false and inaccurate** statement. The opposite did not occur. In 2011, 60% of transmitted pallid sturgeon migrated into the Yellowstone River, less than the typical year but not opposite.	This information has been corrected.
30	Pg 4-2 states “Reclamation and the Corps would use adaptive management to determine the effectiveness of the selected alternative to allow passage of adult pallid sturgeon.” The Corps needs to be removed from this sentence because recent Biop changes have eliminated the Corps responsibility for adaptive management!	This information has been corrected.

31	Pg 4-7 states “A new, raised concrete dam is proposed….flows through the bypass channel.” Include the actual height increase to the first part of sentence and add “and irrigation canal” to the last part of the sentence.	This information has been added.
32	4-11 add bullet that requires contactors to inspect, clean and dry all machinery, equipment, materials and supplies to prevent spread on Aquatic Nuisance Species.	This information has been added to the Chapter 4 and Appendix I.
33	Pg 4-13 the last paragraph demonstrates that other passage structures in the Missouri system have failed for pallid sturgeon. This supports our concerns regarding attraction flows and the large eddy that forms in the location of the proposed bypass fish entrance. The last few sentences specific to these failures should be included on pg 2-3 and 2-11.	This text has been deleted, however the section did refer to conditions in constructed side channels (shallow water habitat) that are not conducive to or specifically designed for pallid sturgeon passage. The bypass channel design is taking those conditions into consideration, and using the best available information to create suitable passage for pallid sturgeon.
34	Pg 4-15 the first paragraph discusses adaptive management and potential adjustments that could be made. A sentence needs to be added that demonstrates that this effort and expense would be the BOR responsibility and then passed onto irrigators. The second paragraph presents an increased weir height of 1 foot. If this is the case one foot needs to be present everywhere the EA talks about increased weir height.	Language has been added throughout the document addressing implementation and funding responsibility. The design height of the weir has been added where appropriate in the document.
35	Pg 4-19, 4-20, 4-21 & A.1-33 have a common theme regarding the rock ramp scoring higher than the bypass channel in three different quotes: pg 4-19 “Although the scores are close, the benefits for the bypass channel are slightly less favorable than the Rock Ramp Alternative.”, pg 4-20 “Again, while the benefits are much higher for either action alternative over the no action, benefits associated with the rock ramp appear to be somewhat greater than benefits of the bypass channel.”, pg 4-20 “The hydraulic analysis and FPCI evaluation found that the Rock Ramp Alternative scores slightly higher and more favorably for pallid sturgeon than the Bypass Channel Alternative…”, pg 4-21 “Because large, stable substrates such as boulders and cobbles support larger, more productive invertebrate populations than do unstable gravel and sand substrates, creating a rock ramp could result in minor improvements in the diversity of the aquatic invertebrate community.” and pg A.1-33 “Fish passage benefits modeling, while not all inclusive of all parameters that may affect fish passage, does indicate that the Rock	A section on the rationale used to select the preferred alternative has been added to Chapter 2.

	Ramp option may be slightly better at providing passage to sturgeon and other fish communities…..". All of these support the rock ramp over the bypass alternative but they are dismissed because of cost alone! In other words we get a less beneficial alternative for fish passage because it cost less. All three of these quotes should be added to pg iv and 2-11.	
36	Pg 5-3 add assignment of adaptive management responsibilities to BOR under the Endangered Species Act Consultation.	Language has been added throughout the document acknowledging Reclamation's responsibility for implementing adaptive management measures.
37	Pg 5-5 change "The proposed by-pass channel will improve fish passage…" to "The proposed by-pass channel is intended to improve fish passage…".	This information has been changed.
38	Pg 3 & 4 (Table 2) Appendix E: Where did the cost figures for fish monitoring the first 8 years after project completion come from? In Table 2 identify the two alternatives that are relative to the EA (Bypass Channel 15% Diversion Weir 2 and Original Rock Ramp with Crest 2). I believe that Table 2 does not reflect additional costs of the most recently discussed concerns about rip rap at bypass sill and modifying bypass outlet structure and river bank to reduce or eliminate large eddy.	Cost estimates were developed by an interagency team including MFWP, FWS, Reclamation, and the Corps. These are preliminary numbers that will need to be updated once monitoring requirements are finalized. Construction costs are not continually updated. A 38% contingency was included in the original cost estimate to account for uncertainties that may come up as designs progress.
39	Pg 6 Appendix J adds three paragraphs, without KEA successes, to pg v and 2-11.???	Not clear as to what this comment refers to.
40	Pg 10 Appendix J add language about failed side channel usage of Missouri side channels from pg 4-13 and second paragraph from 4-17 to the 4.0 Adaptive Management Strategy section.	Change has been made
41	Pg 12 Appendix J states "…the bypass channel will be modified accordingly." Add language that describes that the BOR will be responsible for funding these alterations.	The Adaptive Management Plan has been revised and incorporates the lead agencies' positions on funding AM.
42	Pg iv last paragraph. The first paragraph needs to be changed to "Both actions alternatives would attempt to meet the purpose and need for the proposed action, attempt to reconnect the lower Yellowstone River and possibly allow passage of the …..". Building the structure does not equate to meeting the three points: purpose, reconnect and passage. Monitoring is the only way to know if the three points are successful. See previous comments regarding the	The text has been changed.

	use of “ecosystem restoration”.	
43	Ch 1 pg iii states “Originally, because of uncertainties in pallid sturgeon movement, one of the requirements of the BRT’s passage criteria was full river width passage. Since the bypass channel would not meet this criteria it was not carried forward in earlier analysis.” The original scoring of alternatives occurred in 2002, the BRT was not formed until 2005. It is inaccurate and inappropriate to use the BRT as the reason for dismissing the bypass alternative. The bypass channel was not one of the original 110 ideas proposed for addressing the goals of the project in 2002. How did the bypass channel become a reality considering it was not part of the original discussions, compared with other alternatives or presented in the original EA?	The text has been changed in response to this comment.
44	Pg 2-3 states “This alternative would provide passage for pallid…..” the word “would” should be changed to “is expected to” or “intended to”. Building it does not equate to successful passage.	This language has been changed.
45	Pg 4-17 the second paragraph demonstrates our reservations about accepting a fish passage alternative that does not incorporate a full width of the river passage opportunity which also includes the integrity of the existing side channel. This paragraph or content needs to be added to pg 2-3, 2-11 & 4-13.	The Preferred Alternative section describes the factors the lead agencies considered in selecting the preferred alternative, including: the fish passage connectivity index results, constructability, ice forces, cost effectiveness, pallid side channel use, risk, and uncertainty.
46	Pg A.1-15 the ranking and comparison of alternatives looks completely different if you add the bypass channel and add the cost estimates from pg 2-6, 2-10 and Table 2 Appendix E. This simple step should be completed to compare current data and cost estimates with other alternatives of 2005 screening matrix.	The bypass channel was compared against the other alternatives in the table (referred to as the long low gradient channel) at a comparative level of detail and design.
47	Pg A.1-20 states in reference to elimination of a single pumping plant alternative “4) continued effective operation of the Lower Yellowstone Project could not continue because the irrigation districts probably could not afford to pay the O&M costs.” The O&M and power for the single pumping plant alternative projected at $138,000 annually (pg A.1-15) of that $108,000 for power. O&M for bypass is estimated at $138,000 annually (pg 2-6). Identical cost to irrigators whereas elimination of the pumping plant was based upon this O&M cost to the irrigators. Or is this not affordable	There were multiple reasons the pumping plant alternative was eliminated, not just O&M costs. The O&M costs that are displayed in Table A.1 were reflective of 2005 costs and were for comparative purposes. They do not reflect current costs.

	statement in reference to PgA.1-21 where it states power will cost $315,000?	
48	Pg A.1-31 All alternatives were not reviewed and reconsidered by all cooperating agencies. The state was not part of this process because we were not asked or consulted.	Reclamation and the Corps recognized the State and other stakeholders had significant concerns about the alternative identification process. In response, Reclamation hosted a series of meetings during the summer of 2013 to re-engage stakeholders in exploring alternatives for fish passage.
49	Table 3, 6 & 7 Appendix E identifies the two alternatives that are relative to the EA (Bypass Channel 15% Diversion Weir 2 and Original Rock Ramp with Crest 2).	Added a notation at the bottom of the tables to indentify which alternatives are carried forward into the EA.
50	Building a new weir that will be the largest concrete structure ever constructed on the Yellowstone River (threatening the notion that it is the longest undammed river in the lower 48 states). All five diversion dams on the Yellowstone River have substantial impacts on upstream fish migrations. The fundamental reason for the Intake Project is improving fish passage at the Intake dam. Building a new weir that is taller and increases the length of the current dam and rock structure will certainly reduce fish passage by all species and not improve passage for pallid sturgeon.	The Bypass Channel Alternative weir design has been further refined to reduce potential impacts to fish passage.
51	Building a concrete plug in the existing side channel that is a known fish passage route is undesirable. This action will also reduce recreational boating in the side channel.	The Corp and Reclamation will consider design options to improve fish passage at the junction of the bypass channel and existing side channel. The lead agencies along with FWP considered alternatives to separate the bypass channel from the existing side channel; however modeling indicated that the performance of both channels was reduced under these alternatives. Given this information, the parties agree that separating the channels is not preferable and energy should be focused on improving the fish passage design at the junction.
52	Pg ii second paragraph reads “Intake Diversion Dam likely has impeded….”, the word likely should be removed.	This language has been changed.
53	Pg iv: Add “Another feature of the bypass channel is a concrete plug in the existing side channel”.	This description is intended to brief because it is in the Executive Summary, but the description of the structure used at the junction of the bypass channel and existing channel has been expanded in the alternative description section of Chapter 2.

54	Pg iv: Increased dam height is also needed to improve water delivery to the Canal – this needs to be included in this paragraph. This is supported by item number 8, page 2 of appendix J.	Language has been added to address this.
55	Pg iv: The last sentence for the Bypass alternative reads "the bypass channel would improve fish passage and contribute to ecosystem restoration", fish passage is the goal of the bypass but there is no guarantee that it will improve fish passage. Ecosystem restoration is also a strong claim to make considering the uncertainties associated with the bypass channel. The only way to accomplish ecosystem restoration is removal of the dam. Even if fish passage is provided natural stream function is prohibited and the impact has increased as a result of the higher weir in the river and concrete plug in the side channel. Also applies to last sentence of the first full paragraph on pg 2-3.	The goal is for the project to *contribute* to ecosystem restoration. The lead agencies have developed both action alternatives with the intent to achieve this goal. A definition of ecosystem restoration has been added to the document on page iii.
56	Pg v states "…..(rock ramp) has fewer constructability issues than Rock Ramp alternative." The bypass has maintenance issues that must not by dismissed.	The Preferred Alternative section in Chapter 2 describes the factors the lead agencies considered in selecting the preferred alternative, including: the fish passage connectivity index results, constructability, ice forces, cost effectiveness, pallid side channel use, risk, and uncertainty.
57	Ch 1 page iii states "Based on new technical information documenting pallid sturgeon use of side channels" cited McElroy et. al 2012. McElroy et. al investigated migration pathways of least energy expenditure. Does this sentence suggest the bypass will create a lower energy expenditure pathway upstream of Intake?	The sentence was not intended to suggest that the bypass channel would result in less energy expenditure by migrating fish. Energy expenditure is not a BRT criterion.
58	Pg 2-5 fifth paragraph states "It was assumed that the portion of the historic high flow chute used for 1-2 months. With the new bypass constructed the channel should flow 12 months a year, this will certainly change the stability of the existing portion of the channel.	The invert of the proposed bypass channel is 4-5 ft lower than the existing high flow chute and would be designed to maintain stability.
59	Pg 3-1 the last paragraph demonstrates the importance of the existing side channels as a vital habitat for young fish while rearing and during winter. The side channels value as a passage for non-pallid fishes and its importance as rearing and winter habitat demonstrates why FWP is reluctant to eliminate this side channel as a cost of building the bypass channel alternative.	The lead agencies along with FWP considered alternatives to separate the bypass channel from the existing side channel; however modeling indicated that the performance of both channels was degraded under these alternatives. Given this information, the parties agree that separating the channels is not preferable and energy should be focused on improving the fish passage design at the junction of the two channels.
60	Pg 4-15: We do not agree with the following statement "……impacts to fish passage as it currently exists across the	A 2013 Value Engineering Study considered a range of options to address these concerns, including decreasing the width of the weir

	structure is not anticipated to worsen." This may be true for water velocities only but adding an additional 60 feet (20 feet dam crest plus 40 feet additional feet of rock ramp) will require prolonged burst and swimming speeds at the dam. The combination of similar water velocities, increased swim distance and laminar flow over the concrete dam will likely reduce fish passage for all fish species known to be passing the existing structure. Furthermore, it will not increase passage potential over the dam, particularly for pallid sturgeon. Many of the species that pass over the existing dam are using the resting areas created by the boulders to navigate the margins of the river to pass over the dam. This potential would exist with the new weir but the laminar flow for 20 feet will likely reduce passage. Cartersville Dam is very similar to the proposed weir at Intake. Fish are observed passing over this structure at the margins of the river where boulders allow a pathway. They do not pass through the laminar flows over the concrete dam. Most fish passage likely takes place during high river flows. According to Appendix A2, Att 6-19 figure 7 flows during higher flows of 30,000-40,000 cfs are 10 and 11.5 feet/second over the new weir. Without boulders to create resting areas these velocities over the laminar 20 feet wide concrete weir will be problematic for most species. Fish will spend considerable energy prior to reaching the concrete weir and may not have the reserves to pass over the laminar flow especially with 10+ feet/second velocities.	crest from approximately 20 feet to 6 feet and varying the crest height to reduce laminar flows **(Corps 2013).** As the weir designs progress, these options will be incorporated into the design. Also, modeling indicates that water velocities across the proposed weir are expected to decrease. The text has been changed to address this comment.
61	The paragraph also states "……only positive affects to fish passage as a result of the dam modification are anticipated to occur." If attraction flows from turbulence of the dam or eddy formation at the bypass entrance prevent fish usage the overall net passage at Intake will be reduced because fish passage in the historical side channel will no longer occur and passage over the new weir will likely be reduced or at least will not improve. Secondly, if the bypass channel fails because of siltation or a blow-out occurs from high flows fish passage will certainly be reduced because passage over the weir and through the side channel have also been reduced. In this situation the only financially responsible parties to fix the bypass through adaptive management is the BOR or irrigators which in reality do not have the funding to execute such repairs or modifications.	The text has been changed to reflect that the bypass channel is expected to improve fish passage at Intake .

62	Pg 4-16 last paragraph states "Strong swimming fish (e.g., adult sauger) can currently pass upstream of Intake Dam under most flows." This is partially true, sauger less than 3 years old have difficulty passing over the dam most years. However, the statement is false because the flows at which sauger pass over the structure have not been identified. One certainty is they cannot pass over the dam at "most flows", in fact it probably takes some very specific flow events to allow sauger passage.	The language has been changed to indicate that strong swimming fish currently pass under some flows.
63	Pg 4-23foot access to the portion of Joe's Island that would be bisected by the bypass channel" would be long-term but minimal impact" and only provides limited opportunities. Any access that is publicly accessible, especially by vehicle or by foot, is important and needs to be maintained. This impact would be permanent and should be considered a significant impact associated with constructing the bypass.	When all factors are considered, the lead agencies believe that reduced foot and vehicle access to a portion of Joe's Island does not result in significant environmental impacts. If MWFP has additional information pertaining to the magnitude of these impacts, the lead agencies would be interested in receiving this information.
64	Pg 4-24 last paragraph claims that there is only a "primitive" boat ramp at Elk Island. There are actually two concrete boat ramps at Elk Island.	This information has been corrected.
65	Pg 4-25 state "…boating waterway that provides easier access upstream than the current access of boating over the Rock Ramp". The new higher weir and side channel plug will drastically reduce upstream boat navigation. The new weir would become a significant boating hazard to floaters and/or jet boats. Jet boating over the old dam is fairly popular during higher flows, the higher weir may eliminate this opportunity.	The depth of water above the new weir will be very similar to the depth above the existing weir. Depending on the final selected weir configuration (i.e. inclusion of "notches"), certain locations on the new weir may have greater depth than the average depth over the existing weir. Jet boating opportunities are not expected to be adversely impacted.
66	Pg 4-24 and 4-25 Extensive detail was provided regarding potential impact to boat ramp. It states "……this alternative (bypass) could result in a boating waterway that provides easier access upstream….." Does this statement suggest no boating restrictions within the bypass? I would assume increased bank erosion would be a concern from wakes created by boat traffic.	MFWP has jurisdiction to regulate boating on State waterways. They have not indicated whether they would limit boating in the bypass channel. If monitoring indicates boat wakes are impacting channel morphology, adaptive management measures would be considered.
67	Pg 4-26 upstream boating recreation will be reduced significantly because of reduce ability to navigate over higher weir and assuming upstream boat navigation through the bypass channel will not be tolerated.	See responses to comments #65 and #66.
68	Reducing fish passage from the entire river width (664 feet) plus the width of the side channel (40 feet) to a bypass channel that	The lead agencies are conducting extensive modeling efforts, including construction of a physical model, to identify potential

	accommodates only 15% of river and is only 40 feet wide at the bottom. This is particularly unsettling if the bypass fails to provide fish passage or if the structure silts shut (like the Huntley bypass channel did the first year in operation) or blows out from a large flow event. This concern/uncertainty is demonstrated in the EA on pg 4-13 "it is uncertain exactly what kind of sheer flows or eddies may form near the downstream end of the bypass channel. Complex flows that become established at the fishway entrance could affect passage. Migrating telemetry-tagged pallid sturgeon in the Lower Missouri River have had difficulties and failed to pass exits in constructed side channels with high velocities, turbulent flow and deep scours." If fish passage does not occur through the bypass channel, management of all fish species and populations in the Yellowstone River will be compromised because existing passage options (over the dam or through the side channel) will be reduced or eliminated.	design issues and resolve them prior to construction.
69	Pg v: How can a bypass channel alternative be a "more natural fishway" than the rock ramp? The rock ramp alternative provides fish passage over the entire width of river which is 664 feet wide plus a side channel that is an additional 40 feet wide (pallid sturgeon migrations occur when river flows are high and corresponds when water is flowing through the side channel). Combined, both of these provide fish passage potential over a 704 feet wide area. The bypass alternative reduces passage down to a 40 foot wide area, passage over the new dam will be reduced or eliminated because of the increased height and length and fish passage through the old side channel will be eliminated by the concrete plug. The bypass channel alternative reduces the available width of river for passage from 704 feet to 40 feet, which is a 94% width reduction! Again, how is this considered a more natural fishway?	This characterization has been removed from the document.
70	Pg v: A new three mile long bypass channel, 664 foot wide concrete dam and concrete plug in the side channel are permanent impacts. How can any of these permanent impacts be "considered minor"? Both paragraphs on pg v are weak and need to be rewritten or additional explanation provided as to why the Bypass Channel was selected as the preferred alternative.	The text has been revised to provide a better summary of anticipated impacts. The Preferred Alternative section in Chapter 2 has been expanded to describe the factors the lead agencies considered in selecting the preferred alternative, including: the fish passage connectivity index results, constructability, ice forces, cost effectiveness, pallid side

		channel use, risk, and uncertainty.
71	Ch 1 pg iv first sentence under Nature of Decisions to be Made states "provided no significant are identified….". I believe the work impacts are missing from this sentence.	This correction has been made.
72	Pg 2-11 add another paragraph that shares with readers some of the uncertainties of the bypass alternative. The paragraph should include: pg 4-13 "…it is uncertain exactly what kind of sheer flows or eddies may form near the downstream end of the bypass channel. Complex flows that become established at the fishway entrance could affect passage. Migrating telemetry-tagged pallid sturgeon in the Lower Missouri River have had difficulties and failed to pass exits in constructed side channels with high velocities, turbulent flow and deep scours."; pg 4-17 "….one of the main areas of uncertainty in designing fish passage projects is designing the fishway such that a fish will align with and utilize it. Because the rock ramp alternative is designed to provide passage across the full width of the main channel, and is designed to carry the whole flow of the main channel, there would be very little risk in a fish not being able to find the fish passage feature of the rock ramp."; 3) pg 6 appendix J – use the first three paragraphs under "2.0 Project Uncertainties". All of this information provides, to the reader, some of the inherent difficulty in providing successful fish passage alternatives.	Additional information has been included in the Chapter 2 – Preferred Alternative section describing the factors the lead agencies have considered in selecting the preferred alternative, including: the fish passage connectivity index results, constructability, ice forces, cost effectiveness, pallid side channel use, risk, and uncertainty.
73	Pg 3-1 states "the existing conditions of resources potentially affected by the Intake Project have, for the most part, not changed…."; They actually have changed substantially! Excavation of a 15,500 foot by 40 feet wide channel is a very significant change. Placing a concrete dam in the side channel is also a very significant change because the side channel will no longer pass fish or allow boat navigation.	This section states that conditions have not changed, for the most part, since issuance of the 2010 EA.
74	Design of the new weir must have modifications to accommodate improved fish passage. Suggestions would be reducing the top width from 24 feet, using a crowned surface like the historic dam design, and have lowered sections that would increase water depth and diversity of water velocities.	A 2013 Value Engineering Study considered a range of options to address these concerns, including decreasing the width of the weir crest and designs that eliminate laminar flows (Corps 2013). Several viable alternatives were identified. As the weir designs progress, these options will be incorporated into the design.
75	At the meeting in Billings on March 2^{8th} we had a specific discussion	The lead agencies are conducting extensive modeling efforts,

	about the need to engineer for the large back eddy that forms annually at the proposed location of the bypass channel fish entrance. The engineers did not seem to understand or model for this reality. This needs to be added to the EA including the cost estimates for dealing with the eddy. A similar issue is the migration of the river bank and side channel at the proposed water entrance. Recent review of aerial maps demonstrates that both the stream bank and side channel have changed by approximately 400 feet laterally in the last 60 years. Securing the longevity of the concrete invert sill, considering this lateral movement, will require substantially more rip rap on upstream and downstream shorelines. These two aspects would be a significant cost increase to the construction cost provided in the EA. These increased costs may be substantial enough to make other alternatives cheaper or more practical.	including construction of a physical model, to identify potential design issues and resolve them prior to construction.
76	Pg iv states "It would also replace Intake Diversion Dam with a concrete weir to raise the surface elevation of the river in front of the proposed bypass channel." Dam affect on surface water levels at the point of bypass water entry will be minimal. Modeling must indicate this? Additionally at what flows would this dam be "needed" to provide adequate water level in the bypass channel? The "need" is likely during extremely low flows, when fishes movement is far less than during other seasons/flows. The statement that the dam is needed for the bypass appears is likely inaccurate biologically. Pg 2-3 and pg 2-6 pg 4-7 pg 4-15 similar statements	The lead agencies hope that the collaborative stakeholder meetings conducted in 2013 provided stakeholders with information necessary to understand that the new weir is required to regulate flows into the bypass channel.
77	Pg v: How is the bypass channel "more efficient at providing fish passage benefits", this is an opinion with no factual basis. How can conceptual designs be evaluated on their efficiency at providing fish passage? This needs to be removed! The only bypass channel specifically designed to pass sturgeon in the Yellowstone drainage has yet to pass a sturgeon after 5 migration seasons (T & Y bypass on the Tongue River).	The text has been removed.
78	Ch 1 pg ii last paragraph states "…cost estimate for the rock ramp was approximately $18 million." The 2010 EA on pg 12 states "the estimated cost of construction is $38.8 million. This would include $18.2 million for the new headworks, canal extension, and fish screens, $13.5 million for the rock ramp and $7.1 million for non-contract costs." Why the difference in costs?	The direct costs of the rock ramp and indirect (non-contract) costs were estimated at approximately $18 million.

79	Ch 1 pg iii states "…..rock ramp could approach $90 million." However, pg 2-10 presents a figure of $80 million. Inconsistency is very confusing.	The $90 million dollar reference in Chapter 1 describes the initial estimate that contributed to re-evaluation. The estimate in Chapter 2 reflects refinement of the costs as bypass channel designs have been refined.
80	Pg 2-5 first paragraph talks about four rock structures – what are these?	This section has been revised and expanded, and reference to these structures has been removed.
81	Pg 2-5 the fourth paragraph should mention that the "low-level discharge pipe" is 18 inches in diameter.	Language reflecting the ongoing design of this structure has been included.
82	Pg 2-5 the fifth paragraph needs to include a description of how engineering and construction will address the extremely large eddy that historically forms at the bypass channel fish entrance. This will increase cost of the bypass by a significant amount that is probably not reflected in the construction cost on pg 2-6 and Tables 2 & 3 Appendix E.	The description in this section has been revised and expanded.
83	Pg 2-5 fifth paragraph should include latest knowledge of reviewing aerial photography of stream bank erosion at concrete sill invert. This already demonstrates that the portion of the existing side channel is not stable. Since 1950 (60 years) the bank of the river has migrated approximately 400 feet laterally upstream and downstream of the proposed bypass channel water entrance. The side channels east bank has also migrated approximately 400 feet laterally over the same time period. This new reality will require substantially more rip rap armoring around the concrete sill to maintain its functionality. This will increase cost of the bypass by a significant amount that is probably not reflected in construction cost on pg 2-6 and Tables 2 & 3 Appendix E.	The design team is aware of these issues. The current designs and costs reflect these circumstances.
84	Pg 2-6 states "A new, raised concrete dam….", the amount raised, in feet, and the structural size (664 feet wide by 20 feet long) needs to be included in this paragraph. It should also describe the design which is a flat cap. We would actually like to see it much narrower and crowned like the design of the amount of additional head requirement needed. The weir for the Rock Ramp alternative provides the following language on pg 2-7 "The weir crest would vary in elevation, including at least one low-flow channel for fish passage. The variable crest would offer an array of depth-velocity habitat zones for fish migration under a wide range of flows, which are typical on the Lower Yellowstone River. The channels in the	The description in this section has been revised and expanded. A 2013 Value Engineering Study considered a range of options to address these concerns, including decreasing the width of the weir crest and designs that eliminate laminar flows **(Corps 2013).** Several viable alternatives were identified. As the weir designs progress, these options will be incorporated into the design.

	weir crest would be designed to provide fish passage during late summer and early fall low flows and would be approximately 1-2 feet deep." These same designs need to be incorporated into the bypass channel weir for the same reasons.	
85	Pg 4-2 states "The Bypass Channel Alternative would not change the slope of the main channel of the Yellowstone River." This is inaccurate; according to our understanding the new weir will be higher than the old concrete structure which will increase sedimentation and decrease slope upstream of the dam.	There is no old concrete structure; the historic structure is a rock filled timber crib with rock added above the wood crest. The elevation of the proposed weir in 30% design is approximately 1990.5. Current and future analyses are considering variation in the crest elevation between approximately 1988 and 1991. The current weir, with the rock on top of the crest, likely varies between 1988 and 1992, depending on time of year and whether or not rock has recently been added.
86	Pg 4-3 and pg 4-4 The channel migration zone is mentioned. Joe's Island, location of the bypass, is located in the migration zone. What happens if lateral migration occurs? The bypass water entrance is also located in the channel migration zone. The water entrance is located on an outside bend within the migration zone, thus it would appear there is potential for migration in this location. Would migration at this point be detrimental to the water entrance? If stabilization is required at this location the estimated impact and affect to channel migration zone acres was grossly underestimated. In addition, the bypass is equipped with concrete and rip rap stabilization to prevent avulsion as stated on pg 4-7 thus affecting impact to channel migration zone further supporting the assumption that the impact to channel migration zone acres was grossly underestimated.	There is stabilization to ensure the channel does not migrate at the entrance and exits. This stabilization has been accounted for in the EA.
87	Pg 4-14 states "the bypass channel is expected to function very much like a natural side channel, and as such, is likely to be utilized by many species of fish including sturgeon." This is exaggerated, the current dam causes significant turbulence and water velocities that are not experienced at all the other side channels that pallid sturgeon utilized. Limited attraction flows resulting from the large eddy at Intake Dam are also not experienced at any of the side channels encountered by pallid sturgeon.	The text has been changed from "expected" to "intended".

88	Pg 4-16 an 18” culvert in the concrete plug will become plugged within the first year by siltation or woody debris or a combination of both. This will result in the side channel being dewatered and eliminate this historic fish habitat and passage route most of the year – it would only be recharged when a 60,000 cfs flow event occurs. This opinion comes from years of watching culverts twice this size fail repeatedly. Unless a success example of this size of culvert being used on the Yellowstone River is provided the deductions provided in the EA about the benefits of this culvert are inaccurate.	The Corp and Reclamation will consider design options to improve performance of the structure at the junction of the bypass channel and existing side channel.
89	Pg A.1-32 the BRT did provide input on the two action alternatives but they did prefer the rock ramp over the bypass alternative. This should be noted in the EA.	The Corps and Reclamation continue to work with the BRT and the Fish and Wildlife Service to improve and evaluate the alternatives.