Independent Science Advisory Committee (ISAC)

2013 Report on the Platte River Recovery Implementation Program (PRRIP)

Islands in Platte River near Elm Creek during high flows, Oct 2, 2013.

Submitted to

PRRIP Governance Committee

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Introduction

Prior to and during the ISAC meeting in Kearney on October 1-3, 2013, the PRRIP requested written input from the ISAC on the following 7 questions (listed with letters so as not to be confused with the Program's 11 Big Questions):

- **A)** Are the 2013 Big Question assessments logical based on your understanding of Program data and consistent with what you have learned during your involvement with the Program?
- **B)** Based on your understanding of the Flow-Sediment-Mechanical (FSM) management strategy, should Program data, collected during natural high flow events in areas in sediment balance (i.e., below Kearney), be used to provide insight into whether management actions such as Short-Duration High Flows (SDHF) will result in the creation of suitable in-channel tern and plover nesting habitat as defined by the Program?
- **C)** Can the Program still learn important information relevant to decision-making from the results of the FSM "Proof of Concept" experiments at the Elm Creek and Shoemaker Island habitat complexes?
- **D)** Does the technical information provided to the Governance Committee in the 2012 State of the Platte Report and subsequent annual State of the Platte Reports seem useful for making policy decisions on program management actions?
- **E)** Do all reports, documents, or other reference materials need to be published in refereed journals in order to be considered useful for making policy decisions on program management actions?
- **F)** Does the ISAC recommend any improvements to the Program's peer review process?
- **G)** Should the Program pursue publication of PRRIP-related manuscripts in refereed journals either as a special issue compendium or as individual manuscripts? If 'yes', what would be the purpose of publishing?

Our responses to these questions are below.

A) Are the 2013 Big Question assessments logical based on your understanding of Program data and consistent with what you have learned during your involvement with the Program?
Reference Documents – 2012 State of the Platte Report (including Appendix A, ISAC commentary on 2012 Big Question assessments); September 2013 Big Questions table; 2013 Big Questions presentation on 1 October 2013; 2013 Big Questions issues table (in development); 2013 State of the Platte Report (in development).

We begin with some general comments, and then move into specific comments on each of the 11 Big Questions.

- The 2013 State of the Platte Report only has a detailed written response to Big Question 6, which we discuss below together with each of the Big Questions. Our responses also reflect results conveyed in the 2013 Big Questions presentation, and further pondering of our previous comments in 2012.
- The 2013 SPR includes a section on 2013 Assessment Statements, Counterpoints, and Clarifications Table (pg. 12-18). This is a useful format, and when condensed will help the Program to crystallize differences of opinion on key issues, which is helpful to structure dialogue.
- Over the years, the ISAC has been very impressed with the responsiveness of the Program to our suggestions. As the Program moves towards completion of the 2013 State of the Platte Report we would like to emphasize the importance of ensuring that the Program responds to our recommendations in Appendix A (pages 36-37) of the 2012 State of the Platte Report, either implementing the ISAC's recommendations, providing their rationale for not doing so, or requesting further clarification and discussion.

BQ 1: Will implementation of SDHF produce suitable tern and plover riverine nesting habitat on an annual or near-annual basis?

Recently there has been some discussion within the Program of the respective roles of SDHF and natural flows. SDHF has been defined in various documents, as listed below with key phrases highlighted:

- Relevant parts of the Adaptive Management Plan (AMP, 2006) include:
    - "Relatively modest management treatments (water during certain periods) will reduce the power of field-scale experiments to detect an effect of the Program over the entire area of interest. Nevertheless, manipulative experiments at the field, meso, and microcosm scale may allow relatively powerful experiments that can detect treatment effects and patterns, and aid in the overall assessment of the Program's effects during and at the end of the First Increment. Also, the design of Program monitoring will take advantage of likely natural events such as large natural pulse flows and similar management of non-Program lands." [AMP, pg. 13]
    - **"Hypothesis PP-1:** Flows of varying magnitude, duration, frequency and rate of change affect the morphology and habitat quality of the river, including:
      · Flows of 5,000 to 8,000 cfs magnitude in the habitat reach for a duration of three days at Overton on an annual or near-annual basis will build sand bars to an elevation suitable for least tern and piping plover habitat;
      · Flows of 5,000 to 8,000 cfs magnitude in the habitat reach for a duration of three days at Overton on an annual or near-annual basis will increase the average width of the vegetation-free channel; "[AMP, pg. 16]
    - "Using the Environmental Account in Lake McConaughy and the Program's ability to deliver 5,000 cfs of Program water at Overton, as well as the flexibility in the CNPPID and NPPD canal and reservoir system operations (assuming mutually acceptable arrangement can be made for the use of that flexibility), short-duration near-bankfull flows will be generated in the habitat reach in the springtime or at other times outside of the main irrigation season. The intent is to achieve these flows, if possible, on an annual or near-annual basis. Testing will begin in the first year of the Program with a pulse flow target of up to 5,000 cfs for three days at Overton." [AMP, pg. 24]
    - "Short-duration High Flows: In the context of the Program, these are defined as flows of approximately three to five days duration with magnitudes approaching but not exceeding bankfull channel capacity in the habitat reach. These flows are desired on an annual or near-annual basis to help scour vegetation encroaching on channel habitat areas and to mobilize sand and build ephemeral sandbars to benefit the target species." [pg. 6 of Section 11 of the Water Plan, which formed Attachment 5 of the AMP; pg. 316 of the pdf found here]
- The text under BQ 1 on pg. 11 in the 2012 State of the Platte Report (henceforth abbreviated as **2012 SPR**) was derived from the description of hypothesis PP-1 on pg. 16 of the AMP, and the 2012 SPR uses various lines of evidence to evaluate this hypothesis:
    - "Based upon the SedVeg model and associated assumptions in the FSM management strategy, it is hypothesized that under a balanced sediment budget, a SDHF of 5,000 to 8,000 cfs magnitude for three days (50,000 to 75,000 acre-feet) will build sandbars to an elevation that is suitable for tern and plover nesting." [page 11 (lines 2-5) of 2012 SPR]

- On September 24, 2013, the USFWS issued a 3-page document entitled "FWS Recommendations for PRRIP FSM Implementation" which included the following statements:

    - "The Service believes it is not feasible to address the ability of short-duration high flows (5,000-8,000 cfs) to create and maintain habitat for the target species under existing conditions at the current time. Effort during the remainder of the first increment should instead be focused on the other components of the FSM strategy including (1) increasing channel capacity for flow events (e.g., resolving the North Platte chokepoint); (2) implementing sediment augmentation to reduce the sediment deficit; and (3) using mechanical channel manipulation to widen and clear the channel. Once short duration high flow events can be implemented, it will be possible to analyze and evaluate flow management strategies relative to FSM and increasing the 1.5 year return flow (Q1.5)."

    - "Flow - Flow management (by the PRRIP or the FWS acting as the EA Manager) is currently so limited and constrained that testing the suite of management actions outlined within the AMP is not realistic or achievable. Fotherby (2008) described that the post-Kingsley dam Q1.5 ranged from approximately 3,500 to 6,000 cfs. The PRRIP is currently unable to increase the existing Q1.5. A flow release in 2009 achieved magnitudes ranging from 3,360 to 3,600 cfs while a release in 2013 ranged from 3,690 to 4,070 cfs. Consequently, there is no way to evaluate short duration high flow events and the associated effects given that the PRRIP is unable to release flows within the target range (5,000-8,000 cfs)."

    - "More recently, naturally high peak flow events have also occurred on the Platte River (2008, 2010 and 2011) and have altered ecological conditions to varying degrees based on the magnitude and duration of the peaks and the existing conditions when they occurred. A substantial reduction in vegetation occurred and was visibly noticeable after 2011 high flows. Low flows and drought have also impacted the river since the start of the first increment. A substantial increase in vegetation has occurred as a result of these low flow years. Though natural high peak flows provide valuable lessons learned about how flows of different magnitudes affect the river, they are highly unpredictable and cannot be used as a proxy for the effectiveness of short-duration high flows. It is these flows that work in concert with sediment augmentation and mechanical manipulation to restore and maintain habitat for target species. In addition, the short-duration high flows, by augmenting the flow during lower flow years, will over time increase the magnitude of the average annual peak flow. Finally, the peak flows seen during the first six years of the PRRIP are representative of what was observed in the historic hydrograph and we would not expect habitat (quality and quantity) to drastically change without manipulation of flow beyond that observed historically."

ISAC comments on BQ 1 and the USFWS document:

The likelihood of island formation is affected by many factors including channel form, the magnitude, seasonal timing, and duration of flows, and sediment supply. Regarding flows, what matters is what flows actually occur, regardless of whether these flows were naturally generated or from managed releases from reservoirs. The key issue for BQ 1 is whether or not short duration high flows of 5,000 to 8,000 cfs for 3 days, in areas of sediment balance, build sandbars to an elevation that is suitable for tern and plover nesting. The Program does not need to have exactly this magnitude and duration of flows to gain knowledge about their efficacy for habitat creation and maintenance. Flows in excess of SDHF have occurred opportunistically, and where there is sediment balance these events are reasonable tests of SDHF and provide useful information for BQ 1.

The sequence of flows considered under SDHF descriptions is somewhat vague, referring to "annual or near-annual" recurrence. "Near-annual" has been generally considered to mean two out of three years on a running basis. Sequence and timing of flow pulses may be hypothesized to be important as a means to maintain disturbance, and thereby to prevent vegetation encroachment, or as a way to build bars cumulatively over years. Over the six-year period 2008-2013, there have been four years (2008, 2010, 2011, 2013) with opportunistic flows that equaled or exceeded the SDHF criteria, thereby providing useful information on the role of sequence and timing. Moreover, back-to-back high flows in 2010 and 2011 provide a basis for evaluating whether serial high flows are more effective than those separated by one or more years.

Naturally high flows from 2008, 2010 and 2011 provide relevant information for evaluating the effectiveness of SDHF and BQ 1, as do flows in 2013 (i.e., 4,000 cfs SDMF in April 2013; 11,000 cfs in Sept 2013), provided that such evaluations occur in areas of sediment balance. The most compelling evidence for sediment balance are the surveys of river and longitudinal profiles downstream of Gibbon, which do not show aggradation or degradation trends[1]. Mobile boundary modelling (HEC 6T – 1D) provides supportive evidence of sediment balance, indicating that the channel profiles can be maintained with the estimated levels of sediment input and current flows. There will likely be degradation and aggradation on finer spatial and temporal scales within the reaches and years that have overall sediment balance. Sub-zones and sub-periods with aggradation are the areas and times most likely to create island nesting habitat.

We have the following specific comments on the evidence presented for BQ 1 in the 2012 SPR:

- Argument 3 on lines 41-46 on pg. 11 of the 2012 SPO should note that Elm Ck was not in sediment balance in 2010 and 2011, so this evidence is less supportive of the general argument under BQ 1;
- The endnotes should clarify which pieces of evidence have already received peer review, and provide links to those peer reviews (see ISAC answers to Q6)
- We agree with suggestions made by the EDO in presentations that the primary challenge is neither flow nor sediment in the reaches below Gibbon, but rather the wide channel form, which results in less temporal variation in stage than occurs in other rivers where islands are formed and maintained (e.g., in the lower Platte River). In locations where the river channel is relatively wide and well connected with its floodplain, a given increase in discharge produces a smaller increase in stage. Maximum stage sets a limit on the height to which a given flow can build bars. As such, the wide channel and floodplain morphology of the river below Gibbon is not conducive to achieving the stages required to build suitable nesting habitat for tern and plovers. We agree with the statement from Jason Farnsworth of the EDO that:

  > "The Program's minimum suitable height criterion of 1.5' above 1,200 cfs is constant so more discharge is required to increase stage relative to the target in wide channels than in narrow ones. Channels are typically wider in the downstream portion of the Associated Habitat Reach, which decreases the probability of creating suitable habitat at any given discharge."

- It would be helpful to evaluate the importance of channel form for island creation hypothesis by examining the attributes of a range of reaches in the Lower Platte which do or don't build island habitat (i.e., contrasting sites), with the objective of developing a predictive model of the probability of bar formation which could be applied to the Central Platte. This would help to suggest which places along the Central Platte have channel characteristics that make it easier to build in-river, island nesting habitat, and thereby maximize the chances of success.

In conclusion, the information presented in the 2012 SPR for BQ 1 suggests that SDHFs of the indicated magnitude and duration are unlikely to create tern and plover nesting islands in the Central Platte. Based on this evidence, the documents cited in 2012 SPR endnotes 2-13, other written documents we have reviewed, and

[1] endnote 2 in 2012 SPR

presentations at ISAC meetings over the last four years, we agree that the one thumb down conclusion for BQ 1 is appropriate at the present time. Given the importance of this information to future flow decisions by the Program, it would be helpful to have the key elements of supportive evidence presented for BQ 1 in the 2012 SPR (including endnotes 2-13) consolidated into either a single technical report, or a set of linked manuscripts, which would be formally peer reviewed (see ISAC answers to questions E and F). We understand that some of the information in the endnotes for BQ 1 has already been peer reviewed, which should be noted in the consolidated document. This is a high priority for the Program. It would be prudent to organize the consolidated information into a form which could also be submitted for later publication in a journal, following the Program's peer review process (e.g., one synthesis paper, other supportive papers and appendices – see ISAC answer to question G).

Going forward, there is likely to be continued learning about BQ 1 to refine the assessment of BQ1. The current sediment augmentation should create more areas with sediment balance or aggradation, depending on levels of natural flows. After the J2 re-regulating reservoir is completed, implementation of SDHF in 2 out of 3 years with adequate sediment augmentation will by definition be the most direct test of "pure SDHF". However, assessing the effects of "pure SDHF" would be challenging for several reasons. First, it would be difficult or impossible to detect the independent effects of managed SDHF during years with larger natural flows, which could easily swamp effects of managed SDHF. Second, in dryer water years where the signal from managed SDHF would be most easily demarcated, it may be difficult to acquire the volume of water to implement such managed water releases. Third, while having more years of 'before-data' without managed SDHF could increase the Program's ability to detect the complimentary effects of managed SDHF after the J2 re-regulating reservoir is implemented, several challenges will remain in determining the independent benefits of SDHF:

- comparing the effects of [SDHF + natural flows] vs. [natural flows alone] will be very difficult, as there is no control Platte River with only natural flows, or easily defined baseline period for a before-after comparison in areas with sediment balance;
- regressions with flow variables will likely be required rather than before-after comparisons, but a regression approach also has challenges (e.g., effects of flow events are cumulative, not independent; difficult to characterize the appropriate attributes of each flow event as independent variables; difficult to have sufficient post-event data as dependent variables); and
- a year with a natural event of flow magnitude, timing and sediment balance very similar to SDHF would likely have similar outcomes to a year with a managed SDHF release.

In summary, it is appropriate and useful for the Program to evaluate the effects of natural flows at or above the duration and magnitude of SDHF, and to eventually also learn from managed SDHF flows. Not learning from natural flows would vastly extend the length of time needed to more conclusively answer Big Q1.

BQ 2. Will implementation of SDHF produce and/or maintain suitable whooping crane riverine roosting habitat on an annual or near annual basis?

We note that there are two parts to BQ 2, which are best addressed separately:

BQ 2a) does SDHF *produce* suitable WC riverine roosting habitat on an annual or near annual basis?; and
BQ 2b) does SDHF *maintain* such habitat on an annual or near annual basis?

SDHFs are hypothesized to produce and maintain suitable riverine roosting habitat for WC by scouring (removing) in channel vegetation that creates vertical obstructions, reduces unobstructed channel width, and reduces an unobstructed view width. These factors are described in Appendix C, 2012 State of the Platte Report (pg. 50-52), Whooping Crane Habitat Suitability Criteria Descriptions.

The ability to remove vegetation depends on the mechanisms and flows described in the work completed for the Program by the USDA-ARS National Sedimentation Laboratory in association with the University of Tennessee,

led by Dr. Natasha Bankhead[2]. This work clearly shows that SDHF flows are not sufficient to remove most vegetation currently present, particularly *Phragmites*. Hence, the conclusion to BQ 2a) is currently one thumb down.

With respect to question BQ 2b), it is still uncertain whether SDHF is sufficient to *maintain* WC roosting habitat after clearing by spraying or mechanical treatment. The effects of flow and spraying are confounded. The ISAC supports the EDO's ongoing analysis of the expansion of channel to determine if it was related to spraying or flow by examining both sprayed and unsprayed areas. This analysis may help to reduce the uncertainty in BQ 2b). For now, the answer to BQ 2b) is inconclusive, meriting the scratchy head.

Since BQ 2 has two components, one of which (a) has evidence suggesting the answer is *unlikely* (one thumb down) and the other (b) has evidence suggesting the answer is *inconclusive* (scratchy head), then an overall answer of *inconclusive* (scratchy head) seems appropriate in the 2012 SPR and preliminary 2013 SPR.

Though originally related to BQ 5, it is appropriate to re-iterate the comment that we made on the 2012 SPR regarding suitability criteria for WC, because it has implications for the criteria applied to BQ 2:

> "A key issue under Big Question 5 is to re-evaluate the target unconfined channel width for whooping cranes, using roosting site data from both the Platte River and all other rivers where such data exist. There is clearly a large difference between the channel widths that whooping cranes use in the Platte and the channel widths that they are believed to require. The ISAC has indicated in earlier reviews that the Program needs to re-evaluate habitat criteria, and this habitat criterion seems like an excellent focus for such a re-evaluation. " [pg. 37 of 2012 SPR]

We recommend the Program evaluate QA/QC'd data (including locally derived data from aerial and ground observations, local data from telemetered whooping cranes and regional observations of telemetered cranes throughout the Central Flyway) to test if channel widths at observed WC roosting sites are consistent with hypothesized suitable width criteria for WC roosting. Plotting out channel widths for all GPS-controlled, telemetered sites with roosting WCs (both local and regional data), as well as other factors which might influence habitat selection, would reveal the attributes of sites being used, and the reasonableness (or not) of current definitions of suitable habitat.

BQ 3. Is sediment augmentation necessary for the creation and/or maintenance of suitable riverine tern, plover and whooping crane habitat?

The ISAC agrees with the 2012 SPR and preliminary 2013 SPR that it is absolutely necessary to augment sediment (one thumb up). However there are significant unknowns about how far augmented sediments will propagate downstream, the inter-annual variability in the amount of sediment needed given the annual variability in flow, and the challenge of predicting quantitatively just how much sediment is sufficient. Given these uncertainties, one thumb up seems appropriate.

BQ 4. Are mechanical channel alterations (channel widening and flow consolidation) necessary for the creation and/or maintenance of suitable riverine tern, plover and whooping crane habitat?

There are several mechanical actions being used to prepare the channel for FSM, including channel widening, flow consolidation **and** vegetation removal. It makes sense to also include vegetation removal as a mechanical action in the phrasing of BQ 4, since the spraying of *Phragmites* is essential to increase sediment mobility. One thumb up appears to be an appropriate conclusion. Flows are often either too low to remove vegetation, or so high that existing islands are washed away, which implies that mechanical actions will continue to be required

[2] endnote 23 in 2012 SPR

for tern and plover island maintenance. Mechanical actions (including spraying) are likely to continue to be required to maintain unobstructed widths for whooping cranes.

Flow consolidation was meant to move the river more towards a braided condition, and to help scour vegetation from islands. The incremental benefit of flow consolidation at Cottonwood Ranch was judged to be negligible, and was not provided with a 404 permit by the US Army Corps of Engineers[3]. In the absence of flow consolidation, mechanical widening and vegetation removal appears to be even more necessary to maintain suitable riverine habitat for terns, plovers and whooping cranes.

BQ 5. Do whooping cranes select suitable riverine roosting habitat in proportions equal to its availability?

There are three parts to this question which need to be assessed[4]:

1. What habitats do WC select (i.e., what is "suitable habitat")?
2. Are these habitats increasing over time in the Central Platte?
3. If these habitats are increasing over time in Central Platte, do recorded WC stops in the Central Platte make up an increasing proportion of the overall WC population in North America? [beyond BQ 5, but provides a necessary link to BQ 10]

Answering BQ 5 may take a long time, given the small sample sizes of WC observations on the Central Platte. The ISAC strongly recommends analyzing the existing data on WC (both GPS telemetry at all Central Flyway sites used by cranes for roosting during migration and local data collected by the Program through aerial and ground surveys), continuing the telemetry study of GPS-banded birds, and maintaining the current level of banding. We were concerned to learn that the level of banding is expected to gradually decline in future years. This information is vital to both BQ 5 and also BQ 2 (our response to the latter is above).

The ISAC additionally notes the importance of early assimilation of WC telemetry project data. These data have strong influence on pending decision making in the PRRIP, especially in defining minimum channel distances for habitat assessment and channel maintenance. The WC telemetry data also have important potential to test and validate local habitat-use data. An agreement amongst researchers could help to allow early access to these data by the Program without interfering with the rights of primary researchers to be the first to publish in journals.

We understand that habitat availability determinations involve an area 3 miles N and S of the Platte River, from Lexington to Chapman. The Program selects random points within this area and then computes habitat availability for each of these points which are then compared with sites where WC were found. This procedure makes sense. Since WC landing areas are likely affected by the level of moisture / drought in the larger landscape (i.e., what the birds would see as they first approach the Central Platte), it would be worth also including year-specific covariates for this regional habitat attribute (e.g., the area of the rainwater basin, the data that go into the Palmer Drought Index (Palmer 1965), indexed stream flow which would take into account GW withdrawals). Ideally such an analysis would be completed over multiple regions, to test whether interregional variation in moisture within a given year causes WC to shift where they land.

BQ 6. Does availability of suitable nesting habitat limit tern and plover use and reproductive success on the central Platte River?

The ISAC agrees with the Preliminary 2013 SPR that it's reasonable to change the answer to BQ 6 from a scratchy head to one thumb up, based on the Program's recent data analyses. The data analyses presented at the October 2013 ISAC meeting are convincing, and it's worth writing up this work as a manuscript which can be

[3] EDO memo to ISAC on flow consolidation Sept 24, 2013

[4] Parts 1 and 2 are described on pg. 43 of 2012 SPR, which describes hypotheses WC1 and WC3 from the AMP.

easily be updated with more data over time. The ISAC did some analyses to check on the conclusions to BQ 6. We confirmed that the slope of log(nests) for plovers vs. habitat area has a positive slope for program lands, but no slope for non-Program lands, consistent with the 2013 SPR conclusion. In addition, path analyses (Asher 1983) confirmed that nests are correlated with habitat but not time, which is also consistent with the 2013 SPR conclusion.

Alternative hypotheses, which should also be investigated and confirmed as reasonable or rejected:

- H_{a1}: Tern and plover numbers are going up over time in Central Platte on Program lands due to increases in the overall population of terns and plovers in North America, but not on non-Program lands due to some unspecified differences between Program and non-Program lands.
- H_{a2}: Terns and plovers are attracted to more recently created habitats in preference to older habitats (this hypothesis appears to be contradicted by the high fidelity of banded birds to certain sites, so it might only apply to first time visitors to the Platte).
- H_{a3}: The number of nests is more strongly driven by mortality factors (e.g., predation) than by the area of habitat. Since most OCSW habitat areas are fenced and have predator control, it may be very difficult to disentangle the benefits of predator control and increased habitat area.

BQ 7. Are both suitable in-channel and off-channel nesting habitats required to maintain central Platte River tern and plover populations?

The ISAC's concerns about BQ 7 remain, which were raised in the ISAC's detailed comments on the 2012 SPR provided to the EDO. In summary our concerns are:

- It's not clear what criteria are necessary for a yes/no response to BQ 7. Maintaining the population at the present numbers of nesting adults? Without a clear definition of *maintaining tern and plover populations* there is no way to answer this question. How would the Program know if only one or the other nesting habitat were sufficient to 'maintain' this population?
- Does the Program really just want to *maintain* the present populations of both species or does the Program want to increase them?
- What is the Program's measure of the '*population*'? Is it nesting adults, adults + fledglings, or something else?
- The Program would need to have persistent in-channel nesting habitat over a long period of time to be able to assess the relative productivity of in-channel and off-channel nesting habitats. To date it has not been possible to create persistent in-channel nesting habitat other than by mechanical means, and several of those potential nesting islands have washed away in high natural flows. If the tern and plover populations increase in the absence of river nesting (i.e., just off-channel nesting with in-river foraging), then that would provide evidence against BQ7.
- Off-channel nesting habitats require construction and maintenance, but so far it appears that in-channel nesting habitats require at least as much construction and maintenance, and are less durable than off-channel nesting habitats. Off-channel habitat may play an important role by providing nesting habitat during high flow years/seasons when in-channel habitat is inundated.

The ISAC suggests that the BQ 7 should be rewritten in such a manner that it can be feasibly (i.e. quantitatively) answered (eventually) with a thumb up or thumb down response. For example, let's assume that the Program stated that a 5 year running average of 100 nesting pairs of piping plovers was the 'target population' (a hypothetical number). Then it might be possible to build enough off-channel habitats and maintain them free of vegetation to meet this goal, and in- channel bars would not be required for nesting, though in-channel habitat would always be required for foraging.

BQ 8. Does forage availability limit tern and plover productivity on the central Platte River?

The ISAC agrees with the two thumbs down conclusion in the 2012 SPR. We recommend peer review and/or publication of these results.

BQ 9. Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?

The current conclusion is one thumb up, which is reasonable. The peer-reviewed stage change study confirms that answer to BQ 9 is at least one thumb up. If there are minimal predicted effects on water physical and chemical conditions below the Elkhorn River from Program flow management actions (as determined in the peer-reviewed stage change study), then it is unlikely that sturgeon below the Elkhorn River are exposed to any effects from Program flow management actions, either positively or negatively. If evidence were provided which redefined the area of concern to include areas above Elkhorn River (i.e., from ongoing studies by USGS and the Nebraska Game and Parks Commission), then it would be necessary to repeat the stage change study for areas further upstream. The ISAC recommends publishing the water results of the stage-change study in a journal, and using the tool developed in the stage-change study to examine the effects of the proposed operations of the J2 re-regulating reservoir.

While a one thumb up conclusion is justified, we do not support a conclusion of two-thumbs up at this time. The water part of the peer-reviewed stage change study is robust. However, the connection to sturgeon habitat is less certain because we don't know if the area modeled for sturgeon habitat suitability was sufficient given the true distribution of sturgeon, as discussed above. We recommend that the Program uses the stage-change tool to adjust Program water operations to further minimize downstream effects during low-water conditions, and then re-evaluate the evidence for BQ 9.

BQ 10. How do Program management actions in the central Platte River contribute to least tern, piping plover, and whooping crane recovery?

The ISAC agrees with the 2012 SPR that answering this question will take time. We suggest a minor tweak to BQ 10. Since the answer to BQ 10 in the 2012 SPR implies a consideration of cumulative effects, it might be appropriate to make that more explicit in the question (i.e., "How do Program management actions in the central Platte River **cumulatively** contribute to least tern, piping plover, and whooping crane recovery?"). We note that on page 39 of the 2012 SPR, BQ 10 is linked to hypothesis S-1 in the AMP, which explicitly considers a combination of actions, so our proposed tweak is consistent with the AMP:

> **S-1**: A combination of flow management, sediment management, and land management (i.e., Clear/Level/Pulse) will/will not generate detectable changes in the channel morphology of the Platte River on Program lands, and/or habitats for whooping crane, least tern, piping plover, pallid sturgeon and other species of concern. [pg. 14 of AMP]

It might be more feasible to address the cumulative benefits of all Program actions on smaller spatial scales (e.g., tests of SDHF under BQ 1 and BQ 2 in specific locations assume multiple actions such as flow consolidation and sediment balance).

B) Based on your understanding of the Flow-Sediment-Mechanical (FSM) management strategy, should Program data, collected during natural high flow events in areas in sediment balance (i.e., below Kearney), be used to provide insight into whether management actions such as Short-Duration High Flows (SDHF) will result in the creation of suitable in-channel tern and plover nesting habitat as defined by the Program?

Reference Documents – 2012 State of the Platte Report; FSM packet provided to ISAC for October 2013 meeting; Tern and Plover Habitat Suitability Criteria (see 2012 State of the Platte Report)

Yes! See answers to BQ 1 above under ISAC question A.

C) Can the Program still learn important information relevant to decision-making from the results of the FSM "Proof of Concept" experiments at the Elm Creek and Shoemaker Island habitat complexes?

The ISAC believes that it is still worth learning from natural events in advance of managed SDHF events generated by the J2 re-regulating reservoir, as discussed under ISAC question A – BQ 1. It is worth testing FSM in the parts of the river where it has the maximum chance of success, including Elm Creek and Shoemaker Island. If FSM doesn't work in these locations, then it is unlikely to work elsewhere on Program complexes in the Central Platte. The comparison effort with Lower Platte areas described above under ISAC Question A – BQ 1 may provide some insights on channel attributes which maximize the probability of island formation.

D) Does the technical information provided to the Governance Committee in the 2012 State of the Platte Report and subsequent annual State of the Platte Reports seem useful for making policy decisions *on program management actions*?
Reference Documents – 2012 State of the Platte Report

Yes! However, please see detailed comments on individual big questions, from both the ISAC 2012 review and this document.

E) Do all reports, documents, or other reference materials need to be published in refereed journals in order to be considered useful for making policy decisions?
Reference Documents –PPRIP Adaptive Management Plan (2006), Appendix A – Peer Review Guidelines including Attachments A-E; PRRIP – ED OFFICE FINAL 02/06/2008, Peer Review Process Flow Chart

No. The primary attribute of PPRIP products for them to be useful in making policy decisions should be the quality of the work informing the decision, not the outlet where they are disseminated. Rigorous independent scientific review (ISR) can help ensure that decisions and policy making reflect the best scientific knowledge available. Meffe et al (1998) identified seven criteria of an ISR to meet this goal:

1. the best available scientific knowledge is brought into the decision- or policymaking process;
2. the influences of bias and special interests are minimized in environmentally relevant decisions or policy making;
3. science is separated clearly from nonscientific issues;
4. decisions or policies are achieved in an open and transparent manner;
5. all relevant information is considered and evaluated;
6. all conclusions drawn are consistent with the available scientific information, and assumptions are made explicit; and
7. the risks associated with different interpretations of data or alternative management decisions are articulated

The ISAC feels that the current PPRIP peer review process meets these criteria. We recommend that the Program consider three nested types of Program documents, and two levels of peer review (for document types 2 and 3, as illustrated in Figure 1):

1. All program documents (green box in Figure 1).
2. Draft documents subject to PRRIP independent peer review (red box in Figure 1). This Program review process should only be applied to the subset of documents which have important implications for

management decisions. Programmatic peer review should continue *in parallel* with production of executive summary reports, so that it does not slow down learning and feedback to the GC. The Program's current emphasis on rapid data analysis and evaluation, motivated by the annual AMP reporting sessions, is essential. It's more critical to have peer review of draft final reports as you move from a one thumb to two thumbs conclusion on the big questions, and is less critical for scratchy head or one thumb conclusions.

3. Subsequent publication of a journal version of a subset of the final, peer-reviewed documents (blue box in Figure 1). Manuscripts submitted for publication should be those which:
    a. are appropriate for journal publication (i.e., the paper presents innovative information that significantly advances science/management, or provides insightful information about currently important issues that are of more than regional interest) and
    b. are potentially valuable to other recovery / restoration programs; or
    c. if published would have incremental benefits to the Program in terms of greater "weight" in future decisions, including Biological Opinions.

Some studies that are not decision-critical could be submitted to a journal for publication (with Program approval), without having to go through prior independent peer review by PRRIP (i.e., arrow in Figure 1 from the green box to blue box, bypassing the red box). For studies which the Program would like to ultimately publish, it would be prudent to consider this ultimate objective in how the scope of work is crafted for a given study. The ISAC wishes to emphasize that the internal peer review process in the red box of Figure 1 can be as stringent, or more stringent, and more relevant than the peer review process applied by many journals. Other recent papers emphasize the limitations of the journal peer review process (e.g., Conroy et al. 2006, Bohannon 2013). This point was also raised by OMB (2004):

> "Publication in a refereed scientific journal may mean that adequate peer review has been performed. However, the intensity of peer review is highly variable across journals. There will be cases in which an agency determines that a more rigorous or transparent review process is necessary. For instance, an agency may determine a particular journal review process did not address questions (e.g., the extent of uncertainty inherent in a finding) that the agency determines should be addressed before disseminating that information. As such, prior peer review and publication is not by itself sufficient grounds for determining that no further review is necessary." [page 22 in OMB 2004]

> "Section III(4) requires agencies to provide reviewers with sufficient background information, including access to key studies, data and models, to perform their role as peer reviewers. In this respect, the peer review envisioned in Section III is more rigorous than some forms of journal peer review, where the reviewer is often not provided access to underlying data or models." [page 25 in OMB 2004]

The process outlined here is consistent with that recommended by the National Research Council (2002; pg. 44-45) who suggested that "… increasing 'project magnitude' and 'project risks' warrant an increasing degree of independence of review, with an increased depth and complexity of review, and an increased scope and diversity of the expertise of the reviewers", which is illustrated in Figure 2.

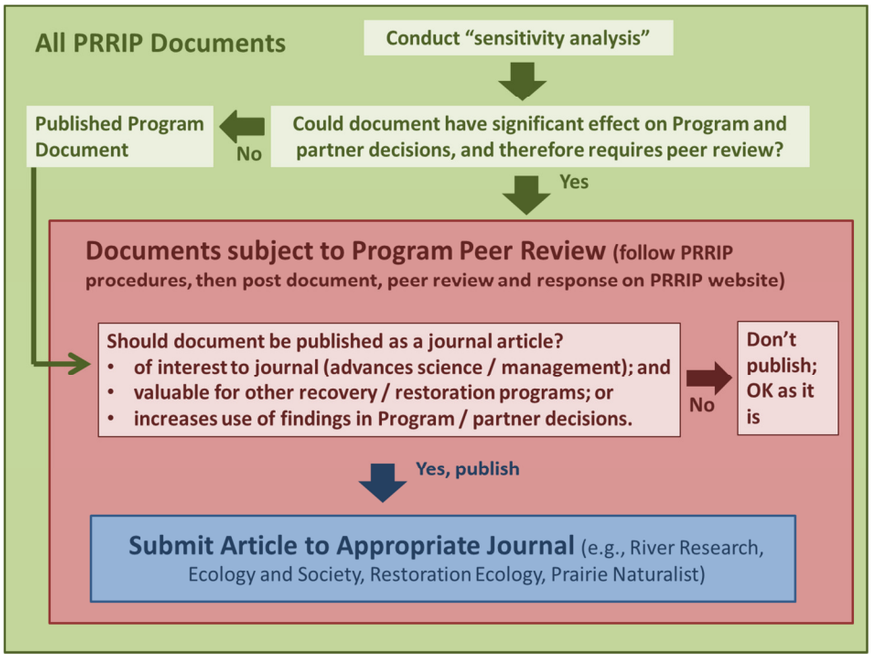

Figure 1. ISAC's recommended framework for thinking about the different types of Program documents, and the criteria for deciding if they warrant Program review or publishing.

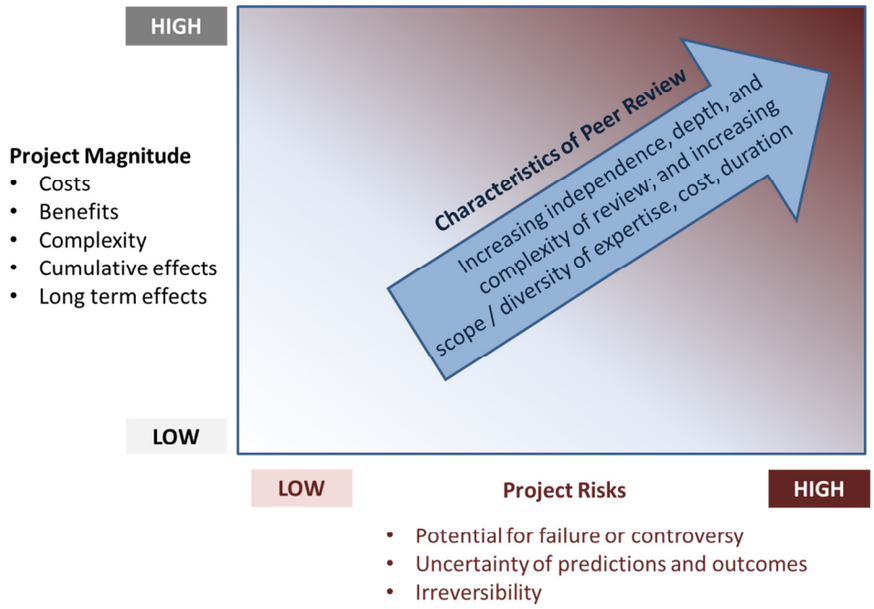

Figure 2. Illustration of how increasing *project magnitude* (y-axis) and *project risks* (x-axis) warrant a higher level of independent peer review (i.e., darker shades further along diagonal arrow) with an increasing degree of independence, depth, and complexity of the peer review, and an increasing scope / diversity of reviewer expertise. In the lower left hand part of the diagram (low project magnitude and risks), independent peer review is likely not required. Adapted from Figure 4.2 on page 45 in NRC (2002).

F) Does the ISAC recommend any improvements to the Program's peer review process?

See above answer to question E. We do not recommend any major improvements to the Program's peer review process, but we do recommend improved documentation of this process. Our evaluation of Program documents indicated that the present peer review process (shown below in Table 1) has improved over what was published in PPRIP Adaptive Management Plan (2006), Appendix A – Peer Review Guidelines including Attachments A-E. Consequently, we recommend that Program 'Scientific Peer- Review Guidelines' be revised to reflect current practices as outlined in Table 1. PRRIP guidelines as shown in Table 1 are consistent with peer review guidelines from OMB (2004) and USFWS (2012). They are also consistent with the recommendations for peer review in Meffe et al. (1998), National Research Council (2002) and Turner (2009). If the Program peer review follows PRRIP guidelines and authors respond thoroughly to peer reviewer comments in the judgment of the EDO (acting like an editor of a journal to assess comments from multiple reviewers), then Program peer review will be adequate.

An effective peer review process occurs when the peer reviewers thoroughly understand the work, and the investigators thoroughly respond to the peer review. We believe that face to face dialogue between peer reviewers and investigators to clarify questions is always beneficial. It increases the reviewers' understanding of the details of what work was done, and minimizes the risk of having peer reviewers misunderstand the scope and consequently recommend approaches that are not relevant to the objectives or have already tried and rejected.

Table 1: Comparison of PRRIP peer-review process with OMB (2004) and USFWS (2012). Source: EDO, based on documents supplied by ISAC.

OMB Final Information Quality Bulletin for Peer Review December 2004	
OMB Peer Review Guidelines Feature	**Present in PRRIP Peer Review Strategy?**
Peer reviewers selected based on expertise, experience, and skills	Yes
Avoid conflicts of interests with peer reviewers	Yes
Reviewers are independent and did not participate in development of work product	Yes
Peer reviewer report includes verbatim copy of comments	Yes
May commission independent entities to manage peer review process and selection of peer reviewers	Yes (Atkins)
Develop clear "charge" or plan of work for peer reviewers	Yes (specific scope of work)

U.S. Fish and Wildlife Service Information Quality Guidelines and Peer Review June 2013	
Service Peer Review Guidelines Feature	**Present in PRRIP Peer Review Strategy?**
List all peer reviewers	Yes
Results of peer review maintained in the public record	Yes
Can utilize management assistance for peer reviews	Yes (use Atkins, which is a firm under contract through 2017 to provide similar services to DOI)
Peer reviewers are external and independent	Yes
Select the best, most qualified peer reviewers with expertise in the subject area	Yes

U.S. Fish and Wildlife Service Information Quality Guidelines and Peer Review June 2013	
Service Peer Review Guidelines Feature	**Present in PRRIP Peer Review Strategy?**
Can review draft documents	Yes (PRRIP does review draft documents and process allows changes in response to peer review)
Can review final documents (peer review comments evaluated and addressed by Service staff)	Yes (PRRIP does review final documents and process allows comments to be evaluated and addressed)
Utilize standing panel evaluations when necessary	Yes (ISAC)
Keep a running record of peer reviews to be completed or underway; update every six months	Generally (keep an annual record, could do a six-month update)
Responses to peer review comments are included in the official record and made available to the public	Yes

G) Should the Program pursue publication of PRRIP-related manuscripts in refereed journals either as a special issue compendium or as individual manuscripts? If 'yes', what would be the purpose of publishing?

The purposes of publishing were listed under ISAC question E (points 3a, 3b and 3c). We offer three possible approaches to externally peer-reviewed publication for consideration, with a mixture of pros and cons (Table 2):

1. individual articles tailored to the requirements of separate journals, and where appropriate multiple articles in the same journal, for example:
    a. insights on adaptive management could be published in journals like Ecology and Society;
    b. tests of hypotheses related to regulated rivers, published in journals like River Research and Applications;
    c. regionally relevant empirical evidence for deriving habitat suitability criteria in journals like The Prairie Naturalist; and
    d. habitat restoration actions and outcomes relevant to listed species recovery in journals like Restoration Ecology
2. a special issue compendium (e.g., River Research and Applications, Restoration Ecology) ; and
3. a thematic book, such as the series on the Science and Practice of Ecological Restoration, published by Island Press.

603 **Table 2**. Pros and cons of three different approaches to publishing Program results.

Approach	Pros	Cons
1. Articles published in separate journals	• most rapid publication of 3 options • topic stands alone • can target the journal most relevant to paper's topic • peer review typically the most rigorous of 3 options • program website can link papers together, including overview papers like Smith (2011) • potentially highest Program credibility when published in top-tier journals	• provides readers with the least integrated source of information • requires repetition of background information on Program • longest time to get the full story of Program accomplishments • open-access policies vary among journals, possibly limiting free electronic access by users; • variable editorial consistency among journals
2. Special Issue Compendium	• enables publishing major program actions into a series of integrated articles under a single cover • generally can be made available as open-access (i.e., free download for any user) • introduction can give Program background so subsequent papers can be less repetitious • peer review rigor typically intermediate between separate journals and thematic book • editor can set uniform standard for papers	• requires editor to administer project; • publication delayed by slowest author • relevance of single issue reduced given ease of electronic access of individual papers • some publishable papers might be excluded due to uniform standards for all manuscripts
3. Thematic book	• provides readers with the most carefully integrated source of information covering multiple dimensions and disciplines • page length less limited than options 1) or 2) • editor can set uniform standard for papers.	• requires editor to administer project • peer review typically the least rigorous of 3 options • recommended to delay submission until most program actions are completed and responses evaluated • publication delayed by slowest author; • access limited to those who purchase book

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