

Responses and Revisions to Review Comments on the IWMM National Protocol Framework for Inventory and Monitoring of Waterbirds and their Habitat (Draft of 4 November 2014)

No.	Comment	Response	Revision	IWMM_ Protocol_ 11-4-14 Start line
1	EXT-2: Why only then? Should be in title.	Agree season targeted by protocol should be in title	Added nonbreeding	title
2	EXT-2: I think of data processing and data management as the same thing.	Agree	Dropped “data processing”	18
3	INT-1: In addition to climate change, can other example[s] be provided (perhaps something more readily apparent to managers, like annual precipitation patterns or regional landscape conditions)	We keep getting comments on this reference to climate change, seems like a token gesture in present context	Yes, removed climate change	181
4	INT-1: reviewer suggested this sentence be change to: “As a protocol framework, it should be used by those cooperating in the IWMM program to develop site-specific protocols for inventory or monitoring of waterbirds and waterbird habitat.”	Agree	Changed to : nonbreeding waterbirds and their habitats; removed reference to NWRS in this sentence and placed in previous sentence to address reviewer’s comment	184
5	INT-1: reviewer suggested this sentence be change to: “The focus of this effort is a multi-species group of waterbirds that use the Atlantic and Mississippi Flyways of North America during winter and migration	Good point	Made change and replaced “effort” with” framework”	203

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6	EXT-3: Some management techniques may be complimentary between species or guilds. The point should be facilitating integrated management, not painting it as having to pick one species or guild over another.	“over another” seems to be the issue	Reworded; substituting “integrating” for “targeting” to get closer to addressing the reviewer’s point	206
7	EXT-2: “annual and life” are different; which is it?	“annual life cycle” used by Williams, B. K., Johnson, F. A., & Wilkins, K. (1996). Uncertainty and the adaptive management of waterfowl harvests. The Journal of wildlife management, 223-232.	added citation for clarity and reference by other readers	207
8	EXT-2: Confusing usages of “objectives.”	Not clear why from comment	Changed wording according to next comment and added reference to Survey Protocol Handbook;	216
9	INT-1: reviewer suggested this sentence be changed to: “Both management and sampling objectives should be considered when using this framework to develop site-specific guidance.”	Agree	Made change but omitted “Both”;	216
10	EXT-2: This is good, but I think “sampling” should be replaced by monitoring. Sampling is the selection of units to monitor or inventory.	The sampling objective provides the info for developing the sample design; lingo follows standards in given references.	previous changes should make it clear that the lingo for the 2 types of objectives follow a standard	
11	EXT-2: The protocol doesn’t have results; applications of the protocol might, however.	Agree	Changed from to “of surveys that follow;	226
	EXT-2: Construction of this sentence not in parallel; it should be reworked.	Agree	Changed order of subjects in sentence per INT-1’s comment (next comment)	226

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	INT-1: reviewer suggested this sentence be change to: "In general, the results from this protocol will not only be useful for informing active management of waterbird habitat at local scales, but also broader waterbird conservation efforts across multiple geographic scales.	Agree	Modified sentence as above	226
12	EXT-2: Two partially inconsistent mappings, I believe.	Irrelevant given the context of the use of BCR as an example scale	No change	
13	INT-1: reviewer suggests removing "established by Joint Ventures"	Agree	Removed mention of JV	232
14	EXT-2: See earlier comment.	See comment 7	added citation for clarity and reference by other readers	207
15	EXT-2: The authors are diverse?? What is relevance of that fact? Place adjective near to word being modified.	Agree	Removed diverse – trimmed sentence	236
16	INT-2: reviewer suggested inserting "habitat" after ...guide.	States could be nonhabitat – i.e cost	3 of the 4 objectives mentioned are not "management objectives." This section modified extensively to provide clarity	237

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17	EXT-2: Jargon.	Agreed	This section modified extensively to provide clarity about management and sampling objectives that could trigger use of this protocol	237
18	EXT-2: Objective will assess the efficacy? I doubt it. Sentence should be carefully rewritten.	Agreed but a citation of a published paper, not making a new statement.	This section modified extensively to provide clarity	237
19	INT-1: This reviewer suggested changes to sentence and then said "Overall, this sentence was somewhat awkward".	Agreed	Revised to give examples of management objectives	237
	Suggested changes: "Although diverse, we anticipate that local management objectives will require knowledge about waterbird use, as well as information to guide state dependent decision making (e.g., choosing a soil disturbance prescription) and assess the efficacy of management actions (e.g., accounting for management costs in terms of use-days or supported populations) (Lyons et al. 2008).	Agreed	Same as above	
20	EXT-2: The survey activity will be counting birds or quantifying habitat conditions, not assessing trends (which I defy you to define, by the way).	Could be used for trends if site specific protocol is long term.	No change	
21	EXT-2: Relative to what?	Relative abundance is a common measure; like relative frequency it would be the proportion of total numbers for each species in	No change	

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		the area of observation		
22	EXT-2: Two “designeds” in one sentence. Confusing.	Agree	Sentence revised	247
23	EXT-2: What are measures? Doesn’t seem like right word here.	Agree	Changed to attributes	249
24	EXT-2: How different from sentences just before this one?	Show more detail in the objective statements—examples of SMART objectives	Removed last sentence and cite the Box 1.1 right after the previous descriptions of common objectives.	243
25	EXT-2: Managers cannot exceed target values?	Not relevant given the context as an example.	No change	
Box 1.1 a	EXT-3: Seems like the second sentence is the management objective and the first is how you’d go about doing so; otherwise, you have two objectives the way it is written	Agree	Removed first sentence and modified second to create 1 management objective; see also modified wording of associated sampling objectives a and b	Box 1.1
Box 1.1b	EXT-3: Using acres above; be consistent with ha or acres	Agree	acres is consistently used in the context of box 1.1 (derived HMP objectives)	Box 1.1

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26	EXT-2: Say what? Wikipedia: "It is a list of all those within a population who can be sampled..."	Good point if the sample frame = the sample unit there is no sample the entire population of is being assessed. We have been down this road before, I think we should just state that this framework does not develop a spatial sampling design – that is up to the site –specific protocol.	To retain flexibility for the development of survey specific protocols, this framework does not provide a sampling design that selects representative management units	273
			Sample units and sampling frame A survey (sample) unit is a single managed or unmanaged wetland on a single date during the non-breeding season. Please see SOP 1 for details regarding how to delineate a survey unit's spatial boundaries. Note that the boundaries of the unit should be fixed through the season and across years to ensure data comparability.	272
			Under this protocol framework the scope of inference, "target universe" or "sample universe", is a single management unit during the non-breeding period. A management unit is defined as a fixed area where recurring waterbird management actions are frequently applied. SOP 1 provides guidance in delineating management unit boundaries. Sampling in a spatial context will not be required when survey units are congruent with management units. In	277

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			<p>situations where survey units are substantially smaller than a management unit, a sample design that permits conclusions about the management unit should be provided in the site-specific survey protocol.</p> <p>Because this framework does not provide a sampling design that selects representative management units, data from different management units should be analyzed independently and inferences to larger spatial scales based on pooling data across management units should be viewed with caution. These types of pooled results may not be representative and therefore may be misleading about a broader (target) universe</p>	
27	EXT-2: Surveys will include dates?	Reword so frame is comprised of dates	<p>Temporally, the sampling frame for the vegetation survey spans all dates during the latter portions of the growing season while the frame for waterbird surveys spans all dates during the non-breeding period.</p> <p>Removed monthly surveys as an option based on database team discussions, simulation study, and previous intent.</p>	<p>295</p> <p>299</p>

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28	EXT-3: reviewer suggests highlighting this sentence.	Highlighting seems to imply that this example is more salient than others. Though it is a good point, highlighting or additional emphasis does not seem warranted.	No change	
29	INT-2: May want to briefly describe how bird use days were calculated. Were averages used for calculations or peak numbers? Some biologists use peaks.	Agree	Use-day method is referenced in analysis section. Revised wording and directed reader to appropriate section: For example, when estimating the use-day parameter, the frequency of counts is the sample size for a single non-breeding season, which influences the estimate of sampling error (see Element 4). The IWMM Population Monitoring Protocol Team (unpublished data) conducted a simulation to.....In this analysis, the Team, (1) set bird use-days to a fixed value, (2) distributed bird use-days across a season to simulate a unimodal migration curve, (3) simulated semi-weekly, weekly, and biweekly counts during the season, and (4) estimated bird use-days from the simulated counts.	318
30	EXT-3: This gets lost in the paragraph. You should highlight your recommendation.	Agree	see above revisions that help to clarify and establish reason for the example about simulated sample size	355

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31	EXT-3: I think that this is the first time “whole area” is mentioned. Should this be defined?	Agree—not really needed here	Removed whole-area	332
32	EXT-2: Here “count” is used both as the survey and as the numbers resulting from that survey. Confusing.	Agree	Changed first mention of counts to survey	332
33	EXT-3: Will detection probabilities be accounted for?	Not directly as a requirement but clearly an option as stated.	No change	
34	EXT-2: Does not change consistently.	Using suggested re-wording doesn’t improve or add to the meaning	No change	
35	EXT-2: This method actually does not apply to the situation described.	Agree	Added language that count adjustments are not always needed. There are available techniques, such as distance sampling (Buckland et al. 2004) or multiple, concurrent observers (Forcey et al. 2006) that would allow cooperators to estimate detectability, unbiased counts, and an appropriate sampling variance. The application of these techniques can increase the reliability of the survey results, but also usually increase the cost of the surveys.	379

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36	EXT-3: What about species like bitterns that may not be easily seen?	Previously established that secretive marsh birds are not part of the "waterbird" community being monitored	No change	
37	EXT-2: This is one long and confusing sentence! Limit the usefulness to the reliability??	Agree - reword	Revised to clarify	394
38	EXT-2: The topic of this handbook is (said to be) monitoring, not setting management objectives, is it? Plus, this sentence doesn't really say anything (at least to me).	Sentence is stating that mgmt. alternatives must be considered. Revision provided for clarity	Managing wetlands as seral stages of vegetation communities enhanced by hydrological manipulations serves as the foundation of many wetland management programs (Gray et al 2013). Both components involve decisions with short-term consequences repeated within discrete management units, a situation well-suited to decision support based on adaptive management principles. The actions listed in SOP 4 are not meant to function as stand-alone actions in an adaptive management framework. The list is provided as founding set of actions that can supplement or be compiled into an adaptive management framework.	406

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39	INT-1: Data management for vegetation and habitat mgt. practices needs to be better addressed. Will it go into AKN also, or a centralized location?	BT: - Seems like a simple sentence added to Element 4 would address all three of these comments.	This database will compile bird survey, vegetation survey, and management action data.	531
40	INT-1: Previous page says to give them to the survey coordinator for archiving. However, are there any archiving guidelines for the coordinators – should those guidelines be further addressed?	There are general guidelines in the Survey protocol handbook for archiving a copy of the data in a universally recognized CSV (comma delimited) form on site with the location identified in a site-specific version of this protocol. The appropriate metadata for describing these kinds of materials should accompany the archived files	Refuge cooperators may add field data sheets and notes as a digital holding in ServCat with an appropriate report, or archived independently in ServCat with its own meta data reference. (Note from LB: <i>We will need to update achieving in AKN as the database is developed.</i>)	551
41	EXT-2: I thought the AKN would be doing this.	AKN is backing up entered data; the protocol also requests an archiving of the original field data forms (when used). These could be scanned, zipped in a folder and added as a digital holding in ServCat with an appropriate report, or archived independently in ServCat with its own meta data reference.	Refuge cooperators may add field data sheets and notes as a digital holding in ServCat with an appropriate report, or archived independently in ServCat with its own meta data reference.	551
42	EXT-2: Wow—this is detailed instruction! Hard to argue with, but it tells user nothing. That may be the purpose. The objective of the program seems to be to collect data systematically, for whatever use they are to	Reviewed and as general intro-material for the section it seems fine.	No change	

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	have. That's okay.			
43	EXT-2: Gimme a break. This is Statistics 1 (not even 101). Who uses the mode?? Let alone the median!	Although a good reminder of basic analytical practice, could be too basic.	Removed examples	578
44	EXT-2: The final report for a long-term monitoring program will be after the program is terminated, right? Is that what is really intended?	Yes.	Added "soon after the all data are collected and analyzed." To the sentence with first mention of "final report."	616
45	EXT-3: I'm not sure how this really gets you a migration curve. The migration curve should consider the context of the surrounding area. It is one year of data. and it is one unit. Weekly number of individuals could be affected by a number of factors. Birds are migrating through the area or region, not through the refuge impoundment.	We imply that curves are only at the unit scale with this fig. Note: I too find labeling this type of graph a "Migration Curve" misleading. Isn't really a relative abundance by time on a given management unit? Isn't a true migration curve a documentation of arrival times of species at different locations throughout the entire migration pathway??	Curves may be developed for a single unit or any compilation of units. changed to chronology	631
46	INT-1: Like the figure. Will it be possible to generate a similar graph showing use days in "mallard equivalents"? It would be easier for managers to integrate the information in planning if in mallard equivalents, compare it to energetic carrying capacity produced in wetland management units, etc. If not, they	Good suggestion we will consider as a database reporting option.	No change Not in current version of database requirements but not precluded by how the observation data is stored and exported.	484

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	will have to export the information and do the calculations themselves.			
47	EXT-2: Suggest sentence rewrite: "A management unit is defined as a fixed area where recurring waterbird management actions are frequently taken."	Agree	Changed decision to actions	955
48	INT-2: May want to clarify and include a statement that if the observer cannot see >70% of unit, to NOT split the management unit into two survey units.	Yes if they cannot see 70% of the it does not fit or they should add vantage points	If an observer cannot visually assess >70% of a unit's area additional vantage points should be added in lieu of splitting the management unit into multiple survey units. Diagram in SOP on unit delineation also changed to clarify.	960 1008
49	EXT-2: Some wetlands occasionally rise above their "high-water" mark. What to do with birds in such situations?	Brian T: - In my opinion, once the boundaries have been established, they should remain fixed, and birds only counted if they fall within the fixed boundaries. If observers desire, they can account for potential extreme events when establishing their wetland boundaries. Occasional, extreme events should not lead to boundaries being redefined. If the hydrology of the area is fundamentally altered and the	Waterbirds observed outside the unit boundaries, during flood events, as flyovers or on adjacent dry land should not be included in the survey unit observations. Waterbirds observed outside the unit boundaries, during flood events as flyovers or on adjacent dry land should not be included in the survey unit observations.	1058

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		unit frequently exceeds the established boundaries, I would suggest that the observer should define a brand new unit that respects the changing conditions on the ground.		
50	INT-2: On the flowchart block for “create new survey unit” – does this mean to create a new survey unit within a management unit meaning the survey unit would be only a portion of the management unit or to find a new management unit to serve as one survey unit? This goes back to my first comment for this element – do you want to split one management unit into more than one survey units?	<p>Brian T: - This criteria for defining survey units was taken up in the past by the Population Team, and the general consensus was to table the discussion until further research can be conducted (Pop Team meeting notes from 3.24.2014). I am not sure what the time table will be for getting this research accomplished. I believe a good number of our participants have split some of their units to date (even though I have discouraged this in some cases). Given that I lack a firm recommendation from the Population Team and historical precedence, I suggest that this practice be permitted to continue for the immediate future.</p> <p>BL: the old flow chart allows for a survey unit that is a subset of a</p>	<p>Clarified that survey units should equal management units but this is not an absolute requirement.</p> <p>Survey unit and management unit boundaries should overlap. However a survey unit may include pockets of a management unit that are not visible during routine surveys to allow for situations where the entirety of management unit is not visible from survey vantage points.</p>	1006

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		<p>management unit or a survey unit without a management unit. Users beware in these situations. The flowchart does promote modifying existing management unit boundaries to accompany survey units. The 70% is an allowance for not being able to see the entire unit. Visibility is recorded and area adjusted use-days could be modified if needed</p>		
51	<p>EXT-3: So for birds with regular diel patterns, where time of day affects behavior, shouldn't surveys be stratified by time of day? Doing all of your surveys at the same time of day seems like it would be biased somehow.</p>	<p>BT: The reviewer's comment raises a good point. It seems like the counts should occur during the diel period of interest for the species. This could be defined based on the management objective; for example, if the manager is interested in supporting foraging activities, the counts should be occurring during a period when birds are most likely to be foraging in a site (as opposed to, say, roosting). So, rather than spreading the counts out across the day, I think that they should only occur during the behavioral period of use that is of interest to the managers.</p>	<p>At inland sites, the time of a 24 hour period for conducting surveys should be based on the management objective. For example, if a manager is interested in supporting roosting activities, the counts should occur during a period when birds are most likely to be roosting in a site.</p> <p>Please provide clarification about time for conducting counts should be determined by the management objectives for the management unit being surveyed (BT's response can be used as an example). Also, what is the source of information used to determine "the best" timing and intervals for conducting the surveys</p>	1043

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		BL – should be covered in site-specific protocols	(e.g., how do you know 4 hours is a good interval between surveys?) Please provide citation (of reference or unpublished analysis of data or personal experience—personal communication) when definitive guidance is given. If there is no objective source or rationale, offer as a suggestion based on author opinion.	
52	EXT-3: Earlier (pg. 4) you stated that only conducting counts when many birds are present in a wetland will positively bias bird use-day estimates. I understand what you mean, but these two statements could be a little confusing.	Different time frames – weekly vs 24 hr.	Removed guidance for targeting max pop for 24 hour period. Suggest you clarify by going back to statement on page 4 and adding “on days” to “only conducting counts----- -- when many birds....”	1046
53	EXT-2: As written, it says to include waterbirds only. Suggested rewrite “include waterbirds in the totals for only the first unit in which you encounter them.” JHT: I think that is what the reviewer intended.	Agree	Mutiple-counting of individual waterbirds should be avoided. If birds regularly flush from units during counts efforts to minimize disturbance during surveys or concurrent surveys may be needed to minimize the multiple-counting of birds Include waterbirds in the totals for only the first unit in which you encounter them. Changed as suggested. Note: this paragraph needs to be reworded—it seems to set up a contradiction, unless you have	1053

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			<p>multiple observers conducting surveys at multiple units concurrently. For example, if one set of observers goes to one unit, counts and then goes to another unit and counts, but only includes the counts from the first unit, how can you count all units in one day? Why would you bother going to another unit in the same day if you couldn't use the count data?</p> <p>Aside from this wording issue, there also seems to be something fundamentally flawed with the goal to lumping counts among units to get a total for the entire site, UNLESS, the total count is based on a census of all waterbirds of interest at ALL units at a site (e.g., a Refuge). Rarely can a census of all management units be done in the suggested time frame, unless you have enough observers to work concurrently. Under this situation (many units, not enough observers to do them concurrently) a formal sampling design is needed for when the objective requires making an inference (Day Use numbers at a site [i.e. data combined from multiple units] have not increased over time) about a site or even flyway. Then,</p>	

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			rather than a census of sites, you would have an estimate of max or total waterbirds counted per unit for the site. If there are only a couple units, this doesn't seem like it would be an issue—BUT this point is not clear in the current version.	
54	EXT-3: Additionally, if birds are seen leaving one unit for another, perhaps they should not count the other unit? Or estimate the number of birds that moved?	<p>BT: Isn't it implied by our earlier statements that observers should keep track of and discount individuals that have been previously counted? I guess we could explicitly state that observers should count the individuals that move into an adjacent unit to facilitate discounting them.</p> <p>Use of double seems to causing some confusion. Changed to multiple and added more measures to reduce repeat counting.</p>	Mutiple-counting of individual waterbirds should be avoided. If birds regularly flush from units during counts efforts to minimize disturbance during surveys or concurrent surveys may be needed to minimize the multiple-counting of birds Include waterbirds in the totals for only the first unit in which you encounter them.	1053
55	EXT-3: Seems like you should say that the unit needs to be finished during one continuous period. You mention this in the section above but I would restate here. In other words, you can't leave and come back.	Once is enough	No change	

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56	EXT-2: Observers generally should estimate the number of birds present WHEN THE OBSERVER ARRIVES, and not count birds that enter during the observations. Conceptually the birds could have been in another surveyed area when the survey began, so they were eligible to be counted twice. This caveat does not apply to birds that are present at the onset but become available for detection only after a while.	BT- No problem with the suggested revision. BL – not arrives but when count starts	There is no time limit for surveys. The observer should tally the waterbirds present when the observation starts but should cease when there is a great deal of movement into the unit. Ideally, all units within a site should be surveyed on the same day.	1060
57	EXT-3: How are you going to account for units that are not surveyed on the same day? It seems like that have to all be surveyed on the same day. If we were talking about a region, I'd say sure within a week. But for one refuge (local), results will be biased if counting one impoundment one day and another the next.	BT: We already recommend that participants conduct counts of all their units on a single day. Not sure how the reviewer would like us to revise?	Still No change, if counts are spread across multiple days the chance of double counting for that surveys period goes up.	
58	EXT-3: Might not just be waterfowl hunting	True but other interests are not that sensitive to interference from surveyors.	No change	
59	EXT-2: Wasn't this said already? Maybe it needs repeating.	Maybe but it is critical – need to change contact info	I say leave in for now – the code for assigning site is not set in stone either. We will have to update the protocol when the new database come online – I'm assuming some contact information will be posted on the database home page.	

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60	EXT-3: Depending on the size of the unit, observers could be missing a huge amount of area even with a 70% rule. If the habitat type, water depth, interspersions, etc. are significantly different in that area, it seems like observers could be missing a birds. Additionally, what about forested wetlands that may have significantly reduced visibility?	BT: - As I stated in response to comment 60, this is a topic that has been taken up by the Population Team, but we have yet to find resolution regarding the definition of the survey units. We intend to address these issues, but we do not have anything better than the status quo to offer at the moment.	I clarified that visibility is for the unit not the birds. If forested sites are less the 70% visible they should not be counted. There is no magic behind the 70% number it is guidance and not a set rule.	960
61	EXT-2: The visible area is unlikely to involve such a straight line.	True but it is fitting a for a hypothetical illustration	No change	
62	EXT-2: Should list for values greater than 3, so observers know when that limit is reached.	Good point we also need to add mph for folks using wind meters	Updated table to scale 6 with MPH Added English to data form.	1752
63	EXT-3: Units should probably go on the field sheet	Space saver?	Added English to data form.	
64	EXT-2: Are you asking for same points used in all years? If so, I suggest being more specific.	We are assuming points covered in sampling designs	Deleted: "from observation points" user can modify location add/remove observation points as needed.	
65	EXT-2: That sounds like it could be challenging sometimes!	Estimating depth is the same whether or not the water is solid or liquid.	No change	

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66	EXT-2: Reviewer suggested changing “ocular” to “visual”	American heritage dictionary ocular=“seen by the eye”.	No change	
67	EXT-2: Categories are not in logical order. Permanent inundation should be followed by >90 days, then 30-90 days, etc.	The first three are nonpermanent and capture flood events. Permanent water does equal a flood.	No change	
68	EXT-3: What would this diagram look like if viewing from a levee?	The diagram is intended to help define the classes not provide a visual guide from a surveyor’s perspective; the latter could certainly be addressed in training scenarios with unit photographs.	No change	
69	EXT-2: I would be curious to see how repeatable the classifications are among different observers.	This concern is being evaluated in an ongoing validation study of the habitat metrics.	Validation studies mentioned in sources of error text.	393
70	EXT-3: Field feeding waterbirds may come back to the roost mid-day and then return to the fields. But that does not necessarily indicated disturbance. So perhaps you should indicated that they leave quickly or rapidly	We defined disturbance as affecting behavior. Birds leaving on their own are not disturbed.	No change	
71	EXT-3: Shouldn’t this be severe or something that indicates disturbance? Limiting is making an assumption that it is limiting bird activity.	Limiting is the most severe as defined. If all or most birds leave the unit the bird activity has been confined or restricted.	No change	

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72	EXT-3: Shouldn't you have an unknown category?	These are for observed disturbances. unknown would be blank	No change	
73	INT-2: Excellent selection of disturbance variables! Very important factor.			
74	INT-2: Good descriptions but seems to be focused on hunting as being a major / chronic disturbance when often it's the passionate bird watchers that can cause more disturbance and chronic issues.	Nonconsumptive use is also covered. The classes make no assumptions about the impact.	No change	
75	EXT-3: So what about controlled hunting areas where hunting is only via blinds so there is site-specific management to control use of the area. This is a confusing category.	Seems clear that this is a class 3, managed = controlled.	No change	
76	EXT-2: Good point to emphasize!			
77	INT-2: Potential source of confusion; may want to include brief explanation again that this is a non-breeding waterbird survey and therefore do not want to include dependent, young waterbirds in counts.	Agree juveniles can fly well before fully grown	Do not include dependent young waterbirds in counts. For geese, swans and ducks, assume juveniles are independent when they are can fly.	1312
78	INT-1: 1) Can "exit counts" be addressed also. For example, for Sandhill Cranes, which often leave roosts early (before sun up) exits counts are the	BT: We can't cover every single species out there, but we do hope the ground counts work for most species.	Uncommon technique but We'll consider adding exit counts to drop down list in database.	

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	<p>only feasible options of counting. There is no time to do a complete count of the wetland/roost site before cranes start to leave roosts.</p> <p>2) What about counting birds in upland sites, such as farm units?</p>	<p>BT: I believe some of our units may already include flooded farm fields - Brian L., can you confirm? Should we clarify this point in the unit definition? I hesitate to try and address all "pet" concerns because we are never going to be able to plug all the holes that readers or potential users find in the protocol.</p> <p>BL: Good points on exit counts – counts made via this technique can be submitted, but do we want to disclose them?</p> <p>BL: I Agree if they want an upland farm field as a survey unit then go for it.</p>		
79	EXT-2: If it's winter, I assume one should use the just-previous growing season, right?	<p>BT: - Obviously, we need to clarify in this paragraph that the observer should be doing this at the end of the growing season.</p> <p>BL: yes</p>	<p>Added: Survey Schedule Vegetation surveys are to be completed once annually, typically late in the growing season when dominant plant species have started to senesce. To improve the accuracy of the seed head index, surveys should also be completed prior to the</p>	1359

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			shattering of influential moist-soil species.	
80	EXT-3: I think that this is going to get confused with interspersions	<p>BT: I am not sure why the reviewer thinks this might get confused with the interspersions metric. Each figure is clearly associated with the correct metric. Brian L., do you see this as being an issue?</p> <p>BL – the figure looks similar to the interspersions example but the caption states we are clearly targeting cover.</p>	No change	
81	EXT-2: This doesn't seem like a field activity, or even one that observers should do. Should be standardized, I would think.	<p>BT: - I see the reviewer's point, and I would have no problem incorporating as a need for the online database and removing from the monitoring protocol.</p> <p>BL Yes I thought we removed that.</p>	For a single composite representing all areas of emergent vegetation, cooperators will compile a list of common plant species and estimate each species' percent cover. For this assessment, the following pertains to percent cover estimates:	1385
82	EXT-2: Suggested changing "ocular" to "visual".	<p>BT: - Not sure I see the reviewer's point - do you, Brian?</p> <p>American heritage dictionary ocular="seen by the eye".</p>	No change	

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83	EXT-2: Seems like they would be recording “no data” whereas in fact they have useful information, right?	Only moist-soil species will be used for a seed head index.	No change	
84	INT-1: Will there be any effort to centralize this information. Should management of vegetation data also be addressed in main text along with the waterbird data management?	BT: - Seems like a simple sentence added to Element 4 would address all three of these comments.	This database will compile bird survey, vegetation survey, and management action data.	531
85	NT-1: Data management for management actions?	BT: - Seems like a simple sentence added to Element 4 would address all three of these comments.	This database will compile bird survey, vegetation survey, and management action data.	531
86	INT-2: Excellent, easy to follow guide.	Need latest version of guide with red lines – change millets and correct chufa food ref with John Stanton Need to review food values.	Replaced guide with 9-16-14 version edited by BL	
87	EXT-2: See earlier comment on this suggestion.	Clarified what can be the “matrix” behind the seed heads.	High stem density is assigned to areas with little bare ground, open water, or other plant species and a high proportion of seed heads to stems. Low seed head density is characterized by large areas of bare ground, open water, or other plant species and a low proportion of seed heads to plant stems for the species being assessed. Moderate stem densities fall between these two extremes	1437

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88	EXT-2: I, at least, find it difficult to determine the extent of bare ground from such photos. I would think vertical photos would be needed.	Photos are meant to be used as examples of seed head density.	High stem density is assigned to areas with little bare ground, open water, or other plant species and a high proportion of seed heads to stems. Low seed head density is characterized by large areas of bare ground, open water, or other plant species and a low proportion of seed heads to plant stems for the species being assessed. Moderate stem densities fall between these two extremes	1437
89	INT-2: Consider adding another column and include the common names	Common plant names are a bad practice in technical pubs - too many variants for any single spp.	No change	
90	EXT-2: FWS may have its own jargon, but strategy in general is very different from actions.	Good point, some refer to strategies as actions but in an SDM context they are usually derived from multiple actions.	Changed to actions	Multiple changes
Gen 1 EXT-1	Sources of Error beginning line 296 of Element 1. This seems to be a very inadequate treatment of the problem of bias and sources of error generally and from visibility bias in particular. For example, it is suggested that double sampling might help reduce bias – but that would only be the case if a survey were stratified to take vegetation type into account – which is not mentioned. Further, the naive reader would not necessarily understand that	I don't see how we can provide a detailed treatment of this topic in National framework. I Agree that it is important but it will have to be fleshed out in the survey specific protocols – will vary greatly by guild and habitat and survey objectives. Brian T – asking for earlier version.	Numerous revisions to this section.	

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	<p>sources of error are all-important, and can lead to drastic over and under-estimates and especially, to huge estimates of variance that could easily make the estimates themselves almost worthless. In short, the discussion seems cursory as guidance and really would not give a manager an appropriate feel for the importance of sources of error in estimates. I realize this is not a statistical text – but neither should it lead managers into a false sense of security in understanding bias. At minimum, this paragraph should attempt to give clear guidance to managers or biologists who are designing surveys and collecting data – should they involve someone with statistical expertise in the design, for example? Much of the data collected on refuges in the past is worthless today, in part because there was so little attention paid to design, especially visibility bias problems in the past. Is there some way that a sample design expert could be used to help set up surveys on each refuge? This would be a one-time cost with obvious maintenance – but could have enormous ramifications for assumptions about the resulting data and its eventual analysis and interpretation.</p>			
Gen 2 EXT-1	<p>Personnel Requirements and Training – Element 6. It is advised that inexperienced waterbird counters spend some time becoming more adept at counting using the Wildlife</p>	<p>Good point, we can explore this in training beyond the protocol.</p> <p>Needs to be vetted. Is there a</p>	<p>No change</p>	

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	Counts program. This suggestion is pretty open ended – with no guarantees that the counter will actually become any better even if they use Wildlife Counts. Why not specify a certain level of achievement in the Wildlife Counts program, before someone can become a counter or estimator. Note that experience is not necessarily an indicator of accuracy – and perhaps all observers should be using Wildlife Counts...	Correlation with performance in a software simulation and in-field practice?		
Gen 3 EXT-1	<p>Double counting (=double observer?) approach is recommended in Element 1 – need to provide some standardized protocol for this, and probably should give guidance as to when it should be implemented.</p> <p>SOP: Waterbird and Environmental surveys. Beginning Line 833 – “Double-counting of waterbirds should be avoided wherever possible. Only include waterbirds in the totals for the first unit in which you encounter them.” This is rather cryptic advice – yes, you should avoid double counting – but how? The second line in italics leaves one no wiser – if you knew that the birds from the first unit crossed over to the second unit, and then of course you should not count them again. However this rarely happens neatly and in fact wintering birds are often on the move all day – so how to know if 50% have crossed over or 20%? I have no particularly good general solution – but feel like</p>	<p>Use of double seems to causing some confusion. Changed to multiple and added more measures to reduce repeat counting.</p> <p>Can we use the impoundment study protocol as a reference?</p> <p>We do not know that this type of an error is a problem for the program. – could be target of future research.</p> <p>Look into relationship to old sources of error treatment.</p>	<p>Mutiple-counting of individual waterbirds should be avoided. If birds regularly flush from units during counts efforts to minimize disturbance during surveys or concurrent surveys may be needed to minimize the multiple-counting of birds Include waterbirds in the totals for only the first unit in which you encounter them.</p>	1053

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	<p>this section of the SOP needs further development with an eye towards delivering more specific advice.</p> <p>There is a second related issue here – in some cases observers will be counting from a single elevated location – in others they will have to move around a dike or perimeter in order to see all of a unit. There is obvious potential for this to have the same kind of bird movement problem that occurs between units. Advice is needed to deal with this within-unit movement problem.</p>			
Gen4 EXT-1	<p>Within this SOP, it's unclear whether observers should be estimating more than once for each unit or not. Many observers will wish to make a couple of estimates because they did not feel like they saw all the birds – or for other reasons of uncertainty. Repeated counts may increase accuracy – or depending on what is reported, repeated counts may introduce upwards bias. In any case to help with consistency there needs to be some statement about multiple counts in here.</p>	<p>We do not recommend multiple surveys. But this approach can still be used to generate a one-time survey count.</p>	<p>Removed double counting to avoid confusion between counting a bird twice and making two counts.</p>	1053
Gen5 EXT-1	<p>Line 861 – Appropriate Weather. The guidance is to survey only when there is a gentle breeze, no more, less than 10 mph. While this might be fine for summer weather, it's going to be relatively rare to find this in winter in temperate North America, and my guess is that</p>	<p>Valid point, not a true constraint</p>	<p>Added mph and up to Beaufort 6</p>	1101

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	<p>this constraint will severely limit the time that observers can sample. Why not go to Beaufort 4 – whitecaps are not yet visible and should not occlude open water birds or disturb birds on mudflats? Finally, why is this constraint relaxed in “windy areas of the Midwest”? Seems like this would introduce bias in any comparative work, and in any case the definition is far too subjective to be of much use.</p>			
Gen6 EXT-1	<p>Disturbance category - categories 2 and 3 seem to be distinguished by any waterbirds leaving. My experience is that one or two birds leaving does not usually indicate disturbance but individual decisions about foraging or roosting. A better distinction might be some proportion – 10%? leaving. This also helps to reduced differences between large flocks (some bird is always leaving or coming) and small ones.</p>	<p>We thought it was obvious that bird movement in the table is always in response to a disturbance</p>	<p>No change</p>	
Gen7 EXT-1	<p>It occurs to me that it would be very helpful to have observers rate their confidence in their estimates, and give some idea of why they are unconfident. For example, they might be extremely uneasy about very large numbers of birds, citing high density and inability to distinguish birds because they are masking each other. Visibility, mixing of species, and frequent interruptions might also be reasons. While confidence is subjective and likely to be unreliable on its own, it might be a useful</p>	<p>Not sure how this would be used – take up with pop team</p>	<p>No change for pending discussion with population team</p>	

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	metric in combination with a statement about the reason for lack of confidence.			
Gen8 EXT-2	My main comment is that this document fails the Truth in Labeling law. The title should reflect the fact that the topic involves only non-breeding birds. And not marshbirds. All of which will make for an even-more-cumbersome title. More importantly, you probably should delete Inventory and Monitoring from title. The document seems to describe how to count the birds, what variables to measure, etc. Does it address inventory that is, estimating total population size? No. Does it address monitoring, that is, tracking populations over time? No. Those of course are major topics in their own right.	Yes on nonbreeding point but the framework is applicable to both inventory and monitoring surveys.	Added nonbreeding	title
Gen9 EXT-3	Incomplete detections—Not every bird will be counted and some will be much easier to see and distinguish. How will aural detections (e.g., American Bittern, King Rail, American Woodcock, etc.) of a species that may not readily be seen be treated? I didn't see mention of this but I could have missed it.	Agree but it is clear that this is a visual protocol. Rails and bitterns, terns grebes and gulls are included as recordable species.	Deleted fowl, shorebird and wading from intro. added "visually scan" to SOP	3
Gen10 EXT-3	Double counting—If you are not conducting a complete census of a refuge on the same day, will you not be confounding your counts of birds within and among impoundments? Why	Add recommendation that if multiple sites are going to be grouped to generate pop estimates, counts be completed	If count numbers are expected to be compiled across units, counts for all units should be completed in one day to minimize the interchange of birds	1052

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	are counters not instructed to complete a survey of a site within the same day? If it is a matter of logistics, that relates to capacity not a scientific reason. If it is a matter of the analyses adequately accounting for surveys on different days, then at some point you should have an analysis appendix that shows how that is taken into account.	in one day.	across units.	
Gen11 EXT-3	Surrounding landscape—Who is doing surveys of waterbird use surrounding the refuge? The use of a refuge may not relate to what is happening on the refuge, especially if it is being used as sanctuary versus foraging habitat. Even if the sole focus is on one unit within a site, it seems like you would still want to know what is occurring on the other impoundments.	We have participating refuges that have been implementing IWMM on off-refuge sites to get that “bigger picture”. Certainly allowable under the protocol.	Added flexibility for defining management units.	1008
Gen12 EXT-3	I did not see a section that described the analyses in any detail. As far as data collection, one hesitation that I have is the timeframe within which units will be sampled as I mentioned above.	We provide standard tools, use-days for example that are coupled with a disclaimer.	No change	
Gen13 EXT-3	I did not see reference to Wetland Techniques (2013), J.T. Anderson and C.A. Davis (editors), Springer, NY. Not sure if this is useful or not but it could be worth including or mentioning.	Added in management actions section	Added but for another reason	
Gen14 INT-1	The elements within the main document are largely focused on counting birds, whereas vegetation monitoring is largely pushed to the SOPs. Maybe it would be best if this document were split into two associated protocols, one	Collecting concurrent habitat information is a key points of IWMM, otherwise it is just another bird survey. Veg and bird surveys will be integrated in	Expanded on use on habitat and management actions in objectives element.	

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	<p>focused on birds and the basic habitat characteristics (salinity, water depth, vegetation-to-water ratio) that are collected along with each bird survey, and a second protocol focused of vegetation characteristics (species composition and coverage) and associated moist-soil plant seed estimation? Aspects of the protocol aimed at estimating seed production and moist-soil plant coverage will be a separate field monitoring and data entry exercise anyway (that is, it will not co-occur with monitoring birds).</p>	<p>decision support. Bird surveys without full veg survey will be very limited in this application.</p>		
Gen15 INT-1	<p>The handling and housing of vegetation data and habitat management data also needs to be better addressed. The document doesn't really address how habitat management data will be handled at all. Is it stored locally at stations along with vegetation data? On a related note, this hits on a reoccurring theme that we really need a habitat management database for the NWRS.</p>	<p>To be detailed as database comes on-line</p>	<p>No change</p>	
Gen16 INT-1	<p>Also, will the AKN database handle the habitat data (water depth, etc.) that is collected concurrently with bird monitoring data, or will it only house the bird information?</p>	<p>Agree</p>	<p>This database will compile bird survey, vegetation survey, and management action data. The database can also be used for managing surveys and collaboration with others.</p>	<p>531</p>
Gen17 INT-3	<p>Element 2: Sampling Design Refuge biologists are interested in how waterbirds are using their refuge (refuge scale), not just a subset of individual impoundments.</p>	<p>See other comments on sampling design, Survey protocol scale.</p>	<p>Multiple changes to sampling design</p>	

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	<p>A revised sampling design may be needed to address this issue when combined with the comments below in Element 4 (units not sampled) and SOW 1 (70% vegetation rule). Impoundments are managed as a system, not independently, at many refuges. Thus, treating each one as its own sampling frame is inconsistent with how they're being managed, which also affects interpretation of bird use. For instance, differing management actions applied to multiple impoundments, only a subset of which are "IWMM," may well cause shifting bird use among them that may not be accurately reflected in the counts on the subset of IWMM units. As a side note, the best design for sampling an underlying population of individuals that may shift its distribution from one survey to the next is either through a new sample of units each time or a combination of permanent and new units. Conducting surveys at the same units (or impoundments) is not a good way to address this.</p>			
Gen18 INT-3	<p>Element 4: Data Management and Analysis</p> <p>The intent of this document is to provide a standard framework for the collection, input, and summary output of waterbird data. This section of the narrative addresses analysis as an almost optional product that will have no shared components across the database. There should be a SOW that addresses analysis and</p>	<p>To be detailed as database comes on-line</p>	<p>No change</p>	

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	<p>basic reporting practices that a naïve observer and user can complete without consultation or prior knowledge of the database workings. The new SOW should incorporate the use of the database to provide cursory analysis (such as in the figures presented here) and the steps the user could take to provide similar summary information in a standardized report. As it appears now, analysis and reporting seem to fall short of providing that framework, and this could be the reason that summary reports using the database are almost never produced. If it takes several pages of narrative to describe these 2 important aspects, there should be associated SOW procedures reflecting this.</p>			
<p>Gen19 INT-3</p>	<p>Standard Operating Procedure 1: Delineating Unit Boundaries</p> <p>I think the ">= 70% " criterion may be too restrictive, which is excluding impoundments from being considered as "IWMM" units. Are the number of birds available for counting linearly related to percent vegetation cover? I wouldn't think so. There's obviously some threshold at which there is too much cover to be useful for counts; we're currently setting that at 70%. At some refuges, significant, unaccounted for bird use occurs in these impoundments simultaneously with use in standard "IWMM" units. It should also be made clear that IWMM units do not need to be</p>	<p>70% figure from Early SDM workshops. – population team working to defend that.</p> <p>Reviewer seems to equate veg cover with not being visible – that is not the case. Although a factor for detectability.</p> <p>We define management units in terms of recurring management actions but do not limit the various types of management.</p>	<p>Management actions may vary in type and frequency. Cooperators have the discretion to survey units ranging from intensively managed moist-soil systems to protected natural wetlands with no habitat manipulation</p>	<p>956</p>

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	associated with actively managed pools. Impoundment system management could include leaving a pool annually to natural flux, but this impoundment could (should) still be included as an IWMM unit. There has been confusion and misconception by some biologists that IWMM units must be actively managed units.			
Science Team	Clearly define birds that should be recorded via the AOU code list. No observations for these spp. should be interpreted as zeros.	Agree	<p>Changed bird survey SOP & added extended bird list provided by project coordinator.</p> <p>“Visually scan the wetland systematically, counting individual waterbirds of each species listed in Supplemental Materials 1”</p>	1735