Peer and Partner Comments Received for SGCN: Invertebrates

Compiled October 2014

MDIFW's responses (in blue) to peer and partner comments were provided by Phillip deMaynadier, Beth Swartz, and Derek Yorks, Research and Assessment Section: Reptile, Amphibian, and Invertebrate Group.

For comments related to the general process for designating species of greatest conservation need, please see the presentations 'SGCN Process' from the July 8, 2014 meeting and 'Revised SGCN Process' from the September 30, 2014 meeting on Maine's Wildlife Action Plan revision website (http://www.maine.gov/ifw/wildlife/reports/MWAP2015.html).

Please direct any questions to mainewildlifeactionplan@gmail.com.

1. Notes from July 8, 2014 break out group

- The SGCN criteria should place more emphasis on understudied taxa.
- Marine invertebrates need better representation; coordinate with DMR.
- Habitat vulnerability could be used as a surrogate for species vulnerability to capture more marine invertebrates.
- Look at the Virginia SWAP 2005 plan as a model for how habitat served a larger role in SGCN identification.
- Consider greater representation across more invertebrate groups using ambassador species.
- Spiders and ants are two examples of groups where a body of knowledge exists in New England that we should be able to use.
- Need to consider the distinction between core range and edge of range rarity/vulnerability during the SGCN designation process.
- Why is the Saltmarsh Tiger Beetle a P2 and not a P1?

The saltmarsh tiger beetle (Cicindela marginata) is a Priority 2 rather than a Priority 1 species because it did not meet the qualifications for Priority 1 designation (for more details see guidance document: Designating Species of Greatest Conservation Need). Specifically, the saltmarsh tiger beetle did not have a high official risk of extirpation, there was no evidence of a recent significant decline, and it is not a regional endemic.

2. Email from Bob Nelson

Well, *Cicindela ancocisconensis* and *C. marginata* *(see above)* might be potential candidates for ultimate inclusion in the SGCN list. The former is found only in the White Mountains portion of Maine, known from three or four localities (I don't have Jonathan Mays' paper on hand here - I think he documented a couple new localities in the same area). The latter is strictly coastal in distribution, on fine, wet sand, and is known from maybe five localities between Phippsburg and the New Hampshire border. And tiger beetles are SO photogenic - kind of like baby raccoons.

Cicindela ancocisconensis is designated as an SGCN Priority 2 species through our ranking process and will remain at this level. It qualified for Priority 2 because it is a high regional conservation priority as well as being rare and understudied taxa.

However, there are also species known from the southern tip of the state who may just have been missed in the past, but on the other hand may be expanding their range northwards into the state (e.g., *Olisthopus micans*, *Poecilus chalcites*, etc.). Likewise, Arctic relicts previously reported from Katahdin (*Miscodera arctica, Carabus chamissonis, Nebria nivalis gaspesiana* and others) may be going or gone, as a result of warming climates - and there wouldn't be much we could do about that anyhow. I was up there last summer, briefly, and only found *Cymindis unicolor* and *Stereocerus haematopus* among the boreal-arctic Carabids. But I'm getting too old and slow to get up the mountain, put in a day collecting, and get back down again before dark. *N. nivalis gaspesiana* was a particular target, but the site where I found it in the early 1980s has been thoroughly trashed by hikers; the species has disappeared over all of its former known range, from Newfoundland and Labrador and the Gaspé Peninsula. **IF** it's still to be found on Katahdin, it would be the last known surviving population.

Thank you for bringing our attention to Nebria nivalis gaspesiana (the Gaspe Gazelle Beetle). We have added it as a Priority 3 species as it appears to meet the rare and understudied taxa criterion; its potential vulnerability to climate change and specialized alpine habitat are noteworthy considerations as well.

3. Email from Andy Whitman (7/1/14)

I would like to see more SGCN inverts.

3. Email from Steve Burian (7/7/14)

Mayflies:
Priority 1 – Currently there are 2 species listed at this level *Epeorus frisoni* and *Siphlonisca aerodromia*. These species are still of concern and work should continue to clarify the extent of their populations in the state. In addition, work should be done to monitor population density at the best sites. Population density studies have really never been done and would provide information necessary to determine if there were

significant declines at these sites. Other types of qualitative sampling can tell you if the species is present or not, but not really much about abundance.
I recommend that both of these species retain their current listing status for the next version of the Maine WAP.

Both species meet the criteria for Priority 1 and will remain at this status level.

Priority 2 – Currently there are 15 species listed a priority -2 status. This number can be immediately reduced by removing *Procloeon ozburni* and *Procloeon intermediale* from the list. New adult material needs to be obtained to verify the previous collection records. Currently I believe that both of these species are known only from single male imagos. I don't have the specimens of these to reexamine and I think is at least a 50:50 chance that the original determinations could have been a little off. I made the original determinations based on just the literature back in the late 1980's – since then I have been able to directly study the type material at the Canadian Nation Collection as well as develop a much better understanding of the diversity of the entire genus here in northeastern North America. Also I believe that both species records were based on single adults males, new sampling should be done to obtain additional specimens to support being on the list or being de-listed.

Based on Dr. Burian's recommendations, both species have been removed from the SGCN list until additional information warrants their re-consideration for inclusion.

Because of the interest in cold-water taxa as thermal indicator species of climate change I highly recommend that new survey work be done to expand your information on: Metretopus borealis; *Rhithrogena undulata*; *Parameletus midas*; *Siphlonurus barbaroides*; *(All of these species meet the criteria for SGCN listing as Priority 3 and will qualify for project funding)* and *Siplonurus demaryi*. *(This species meets the criteria for SGCN listing as Priority 2 and will qualify for project funding.)* Also the species *Siphlonurus barbarus* McDunnough should be added to your list based on records of adults published by McCafferty (2009 – Transactions of Entomological Society of America Vol 135 (3): 353-368) for Penobscot and Piscataquis Counties. *(This species was accidentally overlooked during the SGCN process and has been added to the list as a Priority 2 species.)* The records from that paper are:

ME: Penobscot Co., Crystal Brook, N Patten at Rt. 11, (Imagos) 26-VI-1982, J. Pierson [C.P. Gillette Museum, Colorado State University (Insect Collection)].
ME: Piscataquis Co., Nesowadnehunk Stream, Baxter State Park, (Imagos & reared nymphs), 18-VI-1982, A. Graham; same location, (Imagos) 12, 14, 15-VII-1982, A. Graham [C.P. Gillette Museum, Colorado State University (Insect Collection)]

I had searched for this species while sampling in western Maine, but was never able to find it. It may be entirely limited to the area south of Baxter Park and could be much more uncommon that *Siphlonisca*. Very little is known about the 3 species of *Siphlonurus* listed above and some, if not all, could be good candidates for thermal indicators of habitat change in the central and western part of the state.

Lastly concerning the priority-2 taxa, *Nixe horrida* should be recollected and reared from the Aroostook River. Almost nothing is known about this species and the Aroostook River as well as its tributaries should be carefully surveyed for all *Leucrocuta* and *Nixe* species. It is quite possible that several additional new state records would be discovered.

This species meets the criteria for SGCN listing as Priority 3 and will qualify for project funding.

I recommend that priority-2 list of mayflies be amended to reflect the removal pf *P. intermedial* and *P. ozburni*. *(see above)* If verified I would support their reinstatement for the future. I further recommend removing *Siphlonurus securifer* because collections of this species in both far western and eastern parts of the state suggest a wide distribution in both small ponds and wetlands. *(Based on Dr. Burian's recommendations, this species has been removed from the SGCN list.)* Also I recommend consider adding *Siphlonurus barbarus* based on the records published by McCafferty (2009), its apparent rarity, and apparent habitat association with cool-cold lower gradient streams. *(see above)*.

Nature Serve Comments – Since it seems that data from Nature Serve can be used to support the listing of a species for SGN I thought it might be useful to let tell you about a problem I encountered with Nature Serve data when the State of Connecticut started to review species of insects for its list of endangered, threatened, and special concern taxa. Among the information provided to me by the CT D.E.E.P. for review were 2 species of caddisflies (*Hydropsyche reciproca* and *Banksiola calva*) that based on Nature Serve data and were listed as having G1 and G2 status respectively. In fact there was essentially no data that supported either of these listings. There are no verified records of *H. reciproca* for CT and no specimens of *B. calva* could be found in the collection where they were supposed to have been deposited (hence no way to check the questionable determination). From what I can tell the listing in Nature Serve was entirely based on what could be found in the primary literature without any attempt to determine the veracity of the reports (even though one did note the questionable nature of the records). This little detour into the world of Nature Serve data makes me suspect of practically all of their listings where there is only one or two accounts of a species with no further information about verifying material in collections. This may not be a problem for the species you are considering, but what it tells me is that data gets input to that system without being checked and can get relisted in a variety of ways without being checked. I suppose the bottom-line to this little story is that you should not accept Nature Serve (or any similar data-base) data on face value – all of it should be checked against specimens in collections if possible.

MDIFW appreciates these observations and also recognizes the inherent limitations of unverified specimen reports and some NatureServe global ranks, especially for lesser known invertebrate taxa. To the best of our ability and with valuable input from taxa

experts, we have adjusted the SGCN priority ratings in some cases where the reliability of the data, taxonomy, or rank assessment was in question.

4. Email from Jonathan Mays (7/7/14)

SGCN Priority 1:

- *Vertigo morsei* (Six-whorl Vertigo, a land snail) - this species has only been found at the Woodland Bog in Maine and due to it's hyper-calcareous fen association it's unlikely it occurs anywhere else in the state (we've looked); even at Woodland, it only occurs on a single marl flat there. This is a northern clime species and it's highly likely future climate impacts along with habitat degradation will continue to see this species decline elsewhere in its range. I hope to see this species considered for Maine state endangered/threatened status. Maine is fortunate that the single known site in the state is protected, though stronger listing/protections would be valuable as changes to the water table and/or inappropriate habitat management could wipe the entire population out in one fatal swoop.

Vertigo morsei meets the criteria for SGCN Priority 1 and will remain at this level.

- ***Cicindela marginipennis* (Cobblestone Tiger Beetle)** - similar to the Six-whorl Vertigo, this beetle's entire known population in Maine is limited to a 16km stretch of river in Somerset Co. Unlike the above land snail though, the known adult habitat is not currently protected and faces numerous risks including but not limited to changes in flow regime/flood scouring, development, ATV habitat impacts, agricultural pollution, and collection. Habitat of this beetle's larvae is unknown. This bug has bounced on and off as a candidate for federal listing under the Endangered Species Act; in my professional opinion (and having gone through the state listing form for this species) it is a slam-dunk for state Endangered status.

Cicindela marginipennis meets the criteria for SGCN Priority 1 and will remain at this level.

SGCN Priority 2:

- *Vertigo paradoxa* (Mystery Vertigo, a land snail) - this species and its subsequent recommended ranking has the potential to fall through the cracks without fully considering habitat nuances and Maine's regional responsibility. As mentioned in the SGCN Priority 2 list, we found several new locations for this snail during 2007 surveys and there's potential to expand on those. However, sites where this animal occurs in cedar stands (n=17) versus sites where it occurs on limestone cliff ledges (n=4) are drastically different - the former only represented by a few shells while the later can have significant numbers. In addition, the chance of expanding known EO's for cliff/ledge populations is pretty low (i.e., we've surveyed most of what's available in the northeastern part of the state where this species is known from). There's another issue for *V. paradoxa* too that's not addressed in current law or rule but very important from a scientific standpoint and has potentially relevant conservation implications - the Mystery

Vertigo was discovered and described from a Maine collection by Olof Nylander with the type locality given somewhere in the vicinity of Caribou (his farm to the west). The nearest known population (and for the time being extant and thus the de-facto type locality) for *V. paradoxa* is on a small cliff outcrop (1 of the 4) above Caribou Stream in downtown Caribou. This population, literally a single ledge smaller than a coffee table, is threatened by flooding, development, and/or possible "bank stabilization" to prevent or assist the aforementioned threats. At present it's unknown why this species exhibits a dual habitat association and drastically different observed numbers at each of them; preservation of it's (nearest to) type locality will no doubt aid in parsing this and other conservation questions regarding the Mystery Vertigo as we move forward.

MDIFW appreciates the input here regarding habitat nuances for this species and we have used a professional discretion override to designate V. paradoxa as a Priority 2 species rather than Priority 3.

5. Email from Amanda Shearin (9/3/14)

I received a follow-up message from Rich Jordan (MAWS) regarding why *Eubranchipus* spp. did not make it on the SGCN list. He had brought up this question in our break-out group, and I added it to the notes, but I don't think we explicitly addressed it.

Based on confirmed specimen records, there are only two species of fairy shrimp (Eubranchipus spp) in Maine: E. vernalis and E. intricatus. For the past few years MDIFW has been inviting/collecting fairy shrimp specimen records to help clarify the distribution and status of these two species and a possible third species yet to be confirmed for Maine, E. bundyi, which is present in Massachusetts. To date, E. vernalis has been identified from 11 wetlands in 2 counties and E. intricatus has been identified from 12 wetlands in 5 counties. In addition, 22 other wetlands from an additional 4 other counties are known to host fairy shrimp of undetermined species. Both species are ranked G4 (Apparently Secure) by Natureserve. This data suggests both fairy shrimp species do not meet the suggested standards for Understudied Rare Taxa and neither are they regionally endemic to the Northeast. MDIFW agrees that there is more work to do to better understand this cryptic taxon, but with the information collected to date, it appears the two confirmed fairy shrimp species in Maine, while patchy and uncommon, are not rare or vulnerable enough to merit SGCN status.

6. Notes from Ken Hotopp (6/23/14) on the status of the land snails *Appalachina sayana* and *Neohelix dentifera* in Maine

Appalachina sayana and Neohelix dentifera qualify for Priority 3 designation as rare and understudied taxa given the evidence presented here.

There has been some recent concern among terrestrial mollusk field researchers about a decline of larger shelled species, mainly Polygyridae, in Northeastern North America (Timothy A. Pearce, Jeffrey C. Nekola, pers comm.). Circumstantial evidence suggests

that snails that were more easily collected by early malacologists are no longer as common. However, we lack quantitative data, or a causal mechanism for any large-scale decline.

There are perhaps a dozen “macro-snails” at 15mm or more in diameter in the region, with nine of these in Maine. My experience over the past 20 years of rather patchy collecting around the state is that three species are widespread but usually at low densities in native forest – *Anguispira alternata, Euchemotrema fraternum*, and *Neohelix albolabris*. This appears to broadly agree with Nekola (2008), who encountered all three of these animals in eastern Maine while focusing upon micro-snail distributions. Some other species are localized to certain regions that I have not frequented, or may be introductions or mistaken identifications – *Euchemotrema leai, Haplotrema concavum, Mesodon thyroidus*, and *Triodopsis juxtidens*.

Two species, however, I rarely or never encounter in Maine, even though they are, ostensibly, neither habitat hyper-specialists nor range-restricted - *Appalachina sayana* and *Neohelix dentifera* *(see above)*. I am familiar with both of these animals in other parts of the Appalachian Mountains, even in adjacent parts of the White Mt National Forest in New Hampshire.

Morse (1864) reported both of these animals from the Bethel area. Lermond (1908) reported *A. sayana* as distributed “all over the state,” and *N. dentifera* as “reported only from Oxford, Piscataquis, and Aroostook Counties,” (with N. albolabris “all over the state”). Nylander (undated), collecting around 1900, called *A. sayana* “well-distributed” and *N. dentifera* “rather common” in northeastern Maine (while *N. albolabris* was “not common”). Later, Nylander (1936) said *N. dentifera* was “rather scarce” and *A. sayana* was “the most common of these large shells” on low ground (with *N. albolabris* “nowhere abundant”). Compiling statewide historic and recent reports, Martin (2000) reported *A. sayana* in 11 counties and *N. dentifera* in six.

In recent decades however, Gleich and Gilbert (1976), Hotopp and Smith (1994), and Nekola (2008) did not find these two animals. I have not found them in casual explorations along the Allagash River, West Branch of the Penobscot River, in Baxter State Park, at Lake Umbagog National Wildlife Refuge, Cobscook Bay State Park, or at many other parks, rivers, and lakes. In teaching two field classes about land snails at Eagle Hill we did not find these species in nearby Washington and Hancock Counties. My recollection is that I have found *A. sayana* in the state only twice – one old shell in a wetland in West Bethel (Oxford Co.), and once live animals in a hardwood forest near Norton Brook on Mt. Abraham (Franklin Co.). I have not found *N. dentifera* in Maine.

The caveat to these admittedly circumstantial results is that there has not been a project specifically targeting larger land snails in under-sampled regions or habitats in Maine. We also must acknowledge that declines may have occurred over a much longer timescale than the 15 or 30 years interval standards in Maine’s wildlife action plan.

Despite the uncertainties, there is a need to address the question of a decline in larger land snails, with *A. sayana* and *N. dentifera* being the species of greatest concern in Maine where they now are apparently quite uncommon. I suggest ranking both of these animals as Priority 2 species in Maine's wildlife action plan, considering whether they meet "Criteria 6: understudied taxa." I'm looking forward to learning what experts may have to say about these animals in Maine.

References

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Nylander, O.O. undated. A list of shells from northeastern Maine. Unpublished notes. 4pp.

Nylander, O.O. 1936. Land and Freshwater Shells of Aroostook County, Maine. Privately published by the author, Caribou, ME, 23pp.

7. Notes from Ken Hotopp on the status of the freshwater snails *Stagnicola mighelsi*, *Stagnicola emarginata*, and *Stagnicola oronoensis* in Maine (6/20/14)

For S. mighelsi we used the professional discretion override and designated this species as Priority 1. The fact that S. mighelsi is a State Special Concern species, a regional endemic, and that its rounded NatureServe rank is G2 qualifies it as Priority 2. But given that this snail has been documented to have been lost from four historic sites and considerable survey efforts have only resulted in its discovery at one additional site - bringing the present total to four sites- an elevated designation is warranted.
S. oronoensis is designated as a Priority 3 species using our criteria and will remain ranked at this level. While it is found at only two sites in the state, it has not been the target of formal surveys and it has a fairly wide distribution with a range extending to eastern Ontario.

Stagnicola mighelsi is a relatively large freshwater snail living in a few big, clean, and undammed lakes in northern Maine. Nor do these lakes contain the non-native snails *Viviparous georgianus* or *Bellamya (Cipangaludina) chinesis*.

Over the past five years we have checked the lakes from which *S. mighelsi* and the very similar *S. emarginata* were collected by Aroostook County naturalist Olof Nylander in the early 1900's (1896-1928; Nylander 1936, 1942; Nylander's reports represent the only Maine records for these snails until recently). *Stagnicola mighelsi* or *S. emarginata* remain in only three of these seven lakes.

An historic second-hand, unconfirmed report of *S. mighelsi* at Sebago Lake noted by Nylander was also sought, resulting in the discovery of a population of *Stagnicola elodes* in a Sebago Lake tributary. This species has a much smaller, narrower shell than *S. mighelsi*, and is very poorly known in Maine.

We have also checked 14 other lakes with the potential to harbor *S. mighelsi* or *S. emarginata* – with a focus upon those that are in the watersheds of historic lakes and that are large (more than approximately 1,000 acres surface area). We have found *S. mighelsi* at only one of these - remote and undammed Allagash Lake.

These results suggest a limited distribution and a significant decline in the number of lakes occupied by *S. mighelsi* or *S. emarginata* over the past 100 years. Only four lakes in Maine – Fish River Lake (Fish River), Eagle Lake (Fish River), Square Lake (Fish River), and Allagash Lake (Allagash River) – are known to have these snails, with widespread populations only at Allagash and Square Lakes, and the east end of Eagle Lake. The snails have been lost from Brassua, Cross, Mud, and Portage Lakes.

Stagnicola oronoensis, has persisted more successfully, but appears to be quite localized. We have checked for *S. oronoensis* at the two locations reported by Nylander, and found that these are both extant at the Stillwater (Penobscot) River and Pushaw Lake. We have not encountered other populations of this snail, though it has been only casually sought.

The taxonomic identities of *S. mighelsi*, *S. emarginata*, and *S. oronoensis* are in question. That is, whether these are distinct species, ecotypes, or something in-between. The "parent" species *Stagnicola emarginata* is distributed across northern New England and southern Canada to the Great Lakes. However, any and all of these animals are quite uncommon in Maine, presently confirmed from a total of only six locations. Two historic populations of *Stagnicola* snails have yet to be visited, one in the Fish River between St. Froid and Eagle Lake, and a second in the St. John River near Fort Kent. Genetics work on these animals has been undertaken Dr. Judy Roe at University of Maine at Presque Isle.

Whatever the identity of *S. mighelsi*, based upon its rarity and decline (recognizing that we have a 100-year interval rather than 15 or 30 years), I suggest that Priority 1 designation should be considered. I support the recognition of *Stagnicola oronoensis* as a priority 2 animal, again recognizing some uncertainty about its taxonomy. Genetics and inventory work on Maine's *Stagnicola* species snails should be supported to better understand their conservation status and needs.

Inventory of selected *Stagnicola* species snails in Maine based upon field collections by Ken Hotopp, Alice Hotopp, Emma Donohoe, David Franz, Karen Seo, Ray Tomlinson.

Lake (watershed)	Nylander (1936, 1942)	recent
Alamoosook (Penobscot)	-	-
Allagash (Allagash)	-	mighelsi
Attean (Moose-Kennebec)	-	-
Brassua (Moose-Kennebec)	mighelsi	-
Chamberlain (Allagash)	-	-
Chemquasabamticook (Allagash)	-	-
Cross (Fish)	mighelsi, emarginata	-
Eagle (Fish)	emarginata	mighelsi
Fish (Fish)	mighelsi	emarginata
Grand Matagamon (Penobscot)	-	-
Haymock (Allagash)	-	-
Long (Fish)	-	-
Mooselookmeguntic (Androscoggin)	-	-
Mud (Fish)	emarginata	-
Portage (Fish)	mighelsi	-
Pushaw (Penobscot)	oronoensis	oronoensis
Sebago (Presumpscot)	mighelsi (?)	elodes
Sebec (Penobscot)	-	-
Second Musquacook (Allagash)	-	-
St. Froid (Fish)	-	-
Stillwater River (Penobscot)	oronoensis	oronoensis
Square (Fish)	mighelsi	mighelsi, emarginata
Tunk (Tunk)	-	-

Umbagog (Androscoggin) - -

8. Notes from July 8, 2014 Fish break-out group

- NatureServe data- may not be complete for Maine.
  - How do we address w/ endemic definition? Do we need a broader definition of "endemic"?
    - Peer-reviewed, published documentation of phylogenetic distinction should be acceptable as well.
  - NatureServe utilizes historic range data, but what do we do with species with limited data (horseshoe crab) in NatureServe or species that are not listed as endemic (Arctic char)?
  - Need to add species: Horseshoe crab, cod, cusk, wolfish, shad, etc.? Claire Enterline from DMR to address with staff.

Responses to these comments are forthcoming from Maine DMR.

9. Notes from Q&A sessions following SGCN presentation July 8, 2014

- Why not marine invertebrates like horseshoe crab?
  - Don't know the answer, will talk with Dee Blanton at USFWS to get answer; could be part of species @ risk assessment. DMR is the agency with primary jurisdiction over marine species – standby for more marine taxa to be added to the SGCN list.
- What about considering species that don't currently receive funding – many species on the list are T & E but other species like horseshoe crab are understudied and no dedicated funding- they might be more deserving of money.

Responses to these comments are forthcoming from Maine DMR.