American Malacological Society (AMS) Conservation Committee Imperiled Species News-2012 Annual Review

April 2013

Greetings American Malacological Society (AMS) members and non-members. As part of an ongoing series of installments posted quarterly on current and proposed federal legislation and regulations regarding mollusks, I am posting this 2012 summary as a supplement to the March 2013 edition. This installment summarizes all legislative actions taken in 2012 by the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) on conservation of marine, freshwater, and terrestrial mollusks as they are applied by the U.S. Endangered Species Act (ESA) and other relevant legislation.

Formal notices are published by the USFWS and NMFS in what is called the Federal Register Endangered Species Program (<u>http://www.fws.gov/endangered/laws-policies/federal-register-notices.html</u>). Rules are enacted only for taxa and populations that are specifically named in a Federal Register Notice of Review or the Federal Register Proposed or Final Rule section (Code of Federal Regulations C.F.R. 50 Part 17). Federal Register Notices are issued daily. Notices generally fall within three categories: notices, proposed rules, and final rules. Also included are notices of scheduled hearings, proposed rulings, formal rules and regulations, and in extreme circumstances, presidential orders and proclamations. Public comments are solicited on proposed rules but are required within a given time period.

Before reading this summary, please familiarize yourselves with the basic criteria used for listing of species as Endangered or Threatened. A species is first assessed by the USFWS to determine if a proposed listing is appropriate based on the best available data for listing consideration (U.S. ESA, Section IV). Under the Act, a species may be listed as an endangered or threatened species based on any of five factors: (A) The present destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its existence. Species previously identified as candidates can also be re-assessed based on updated information. A Species Assessment Document is prepared by candidate conservation staff (including non-governmental agency staff with intimate knowledge of any aspect of the natural history of a species). This document is then presented to the USFWS Director (currently Daniel M. Ashe) to determine if a species' status as a candidate should be changed (a bit arbitrary, I know). Assessments are updated annually through a Candidate Notice Review (CNOR) available online at: http://www.fws.gov/endangered/what-we-do/cnor.html. Update summaries for 2012 can be found at: http://www.fws.gov/policy/frsystem/default.cfm.

It is at this stage that we, as a society, can impart a positive influence on imperiled species conservation. Information for Candidate Species is gathered from a variety of sources; State and Federal agency staff, faculty and instructors at colleges, universities, and secondary schools, non-governmental agency staff and volunteers, and non-profit organizations. A major source of information comes from U.S. state Natural Heritage Programs and Canadian Conservation Data Centers. Each is required to produce a State Wildlife Actioin Plan

(<u>http://www.wildlifeactionplan.org/</u>) outlining the steps necessary to conserve wildlife and habitat in each state or territory. The completion of these plans is *absolutely necessary* in order for individual states to receive federal funding from the United States State Wildlife Grants (SWG) program (<u>http://wsfrprograms.fws.gov/Subpages/GrantPrograms/SWG/SWG.htm</u>) and Wildlife Conservation and Restoration program

(<u>http://wsfrprograms.fws.gov/Subpages/GrantPrograms/SWG/SWG.htm</u>). Species not listed on state plans are not eligible for federal funds allocated for conservation and management. If you are not familiar with the SWG plan or the Natural Heritage Program or Conservation Data Center in your state or province, *get to know them today*! You can be actively involved in species and ecosystem conservation simply by allying yourselves with these program staff to exchange information and assist with imperiled species evaluation. Become an advocate and

There are currently 82 such member organizations and contact information (including current staff members) can be found through the staff directory on the NatureServe web site (https://connect.natureserve.org/). The staff at these offices either draft their SWG plans themselves or play an active role in contracting other persons or agencies to draft these plans. Each member of this Natural Heritage Network assembles information on location, habitat, and other conditions of at-risk-species and threatened ecosystems within their domain. Staff within the network have expertise in their fields of study and geographic regions but many programs are understaffed and all are incapable of maintaining a sufficient number of knowledgeable staff to keep up with imperiled species from all taxonomic groups (especially invertebrates)! Information gathered by member programs is often provided regularly to NatureServe, a non-profit conservation organization. NatureServe offers online access to some of this data and periodically assigns global conservation status ranks (G-ranks) to measure conservation (rarity) status for select species and ecosystems.

A summary of proposed and final rulings follows. For future installations, when comments are opened, comments may be submitted via one of the following methods:

(1) Electronically

Go to the Federal eRulemaking Portal: http://www.regulations.gov. In the Search field, enter Docket No. FWS–R5–ES– 2012–0054, which is the docket number for this action. Then click on the Search button. You may submit a comment by clicking on "Comment Now!"

(2) By hard copy

Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R5–ES–2012–0054; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042–PDM; Arlington, VA 22203.

SUMMARIES

U.S. Fish and Wildlife Service Releases Annual List of Candidates for Endangered Species Act Protection

- POSTED: November 20, 2012

- SUMMARY: 40th Anniversary of Endangered Species Act <u>all current Candidate Species</u> <u>are reviewed</u>. An updated list of animal and plant Candidate Species for review is presented. A formal definition of a Candidate Species is reviewed (i.e. plants and animals for which the Service has enough information on their status and the threats they face to propose them as threatened or endangered, but developing a proposed listing rule is precluded by the need to address other higher priority listing actions). Candidate Species do not receive protection under the ESA, although the Service works to conserve them. A summary of status and threats evaluated to determine candidacy qualification or removal is provided. The full list can be found at <u>http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?listingType=C&mapstatus=1</u>

- RESULTS: Thirty-six mollusk species are included as candidates (10 mussels, 8 freshwater snails, 18 terrestrial snails) with no new species added. *Lampsilis bracteata* (Texas fatmucket), *Truncilla macrodon* (Texas fawnsfoot), *Popenaias popei* (Texas hornshell), *Quadrula aurea* (golden orb), *Quadrula houstonensis* (smooth pimpleback), *Quadrula petrina* (Texas pimpleback), *Elimia melanoides* (black Mudalia), *Planorbella magnifica* (magnificient ramshorn), *Ostodes strigatus* (Sisi snail), *Samoana fragilis* (fragile tree snail), *Partula radiolata* (Guam tree snail), *Partula gibba* (Langford's tree snail), *Eua zebrina* (Tutuila tree snail), *Pyrgulopsis thompsoni* (Huachuca springsnail), and *Pyrgulopsis morrisoni* (Page springsnail); One mollusk species: *Pyrgulopsis notidicola* (elongate mud meadow springsnail)

- JUSTIFICATION: The calendar year 2012 had the lowest number of Candidates (192) in more than 12 years. Thirty-six species were added as Candidate SpeciesA single species was removed because it no longer meets the definition of an Endangered or Threatened species.

- LINK: <u>http://www.gpo.gov/fdsys/pkg/FR-2012-11-21/pdf/2012-28050.pdf</u>

Typhlogastrura helleri (Heller's Cave springsnail)

- POSTED: November 14, 2012

- SUMMARY: <u>Proposed Rule Notice of 90-day Petition Finding</u> to list *Typhlogastrura helleri* (Heller's Cave springsnail) as Endangered or Threatened and designate Critical Habitat = <u>listing is warranted and status review initiated.</u>

- JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (D) The inadequacy of existing regulatory mechanisms; and (E) Other natural or manmade factors.

- RESULTS: Review of finding initiated. Information is solicited (submission deadline January 14, 2013).

- LINK: http://www.fws.gov/policy/library/2012/2012-27573.pdf

Margaritifera marrianae (Alabama pearlshell), Fusconaia rotulata (round ebonyshell), Ptychobranchus jonesi (southern kidneyshell), Villosa choctawensis (Choctaw bean), Fusconaia burkei (tapered pigtoe), Fusconaia escambia (narrow pigtoe), Hamiota australis (southern sandshell), and Pleurobema strodeanum (fuzzy pigtoe)

POSTED: October 10, 2012

- SUMMARY: <u>Final Rule</u> to list *Margaritifera marrianae* (Alabama pearlshell), *Fusconaia rotulata* (round ebonyshell), *Ptychobranchus jonesi* (southern kidneyshell) and *Villosa choctawensis* (Choctaw bean) as Endangered and designate Critical Habitat = <u>species</u> **listed as Endangered**; <u>Final Rule</u> to list *Fusconaia burkei* (tapered pigtoe), *Fusconaia escambia* (narrow pigtoe), *Hamiota australis* (southern sandshell), *and Pleurobema strodeanum* (fuzzy pigtoe) as Threatened throughout their ranges = <u>species listed as Threatened</u>

JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (D) The inadequacy of existing regulatory mechanisms; and (E) Other natural or manmade factors.

- RESULTS: CLOSED
- LINK: http://www.fws.gov/policy/library/2012/2012-24161.pdf

Lampsilis rafinesqueana (Neosho mucket), Quadrula cylindrica cylindrica (rabbitsfoot)

- POSTED: October 16, 2012

- SUMMARY: <u>Proposed Rule</u> to list *Lampsilis rafinesqueana* (Neosho mucket) as Endangered and *Quadrula cylindrica cylindrica* (rabbitsfoot) as Threatened and designate Critical Habitat for both = **proposal initiated**

- JUSTIFICATION: To be determined.
- RESULTS: Comments solicited (submission deadline December 17, 2012)
- LINK: http://www.fws.gov/policy/library/2012/2012-24151.pdf

Ptychobranchus subtentum (fluted kidneyshell) *and Pleuronaia dolabelloides* (slabside pearlymussel)

- POSTED: October 4, 2012

- SUMMARY: <u>Proposed Rule</u> to list *Ptychobranchus subtentum* (fluted kidneyshell) and *Pleuronaia dolabelloides* (slabside pearlymussel) as Endangered and designate Critical Habitat = <u>proposal initiated</u>

- JUSTIFICATION: To be determined.

- RESULTS: USFWS proposed listing. Comments solicited (submission deadline December 3, 2012).

- LINK: <u>http://www.fws.gov/policy/library/2012/2012-24019.pdf</u>

<u>14 Freshwater Snail Species</u>

- POSTED: September 18, 2012

- SUMMARY: <u>Proposed Rule 12-Month Petition Finding</u> to list *Juga* new species (n. sp.) 2 (basalt juga), *Juga* n. sp. 3 (cinnamon juga), *Colligyrus* n. sp. 1 (Columbia duskysnail), *Fluminicola* n. sp. 11 (Fredenburg pebblesnail), *Fluminicola* n. sp. 3 (Klamath Rim pebblesnail), *Vorticifex* n. sp. 1 (knobby rams- horn), *Colligyrus* n. sp. 2 (masked duskysnail), *Fluminicola* n. sp. 2 (tall pebblesnail), *Colligyrus convexus* (canary duskysnail), *Fluminicola anserinus* (Goose Valley pebblesnail), *Fluminicola umbilicatus* (Hat Creek pebblesnail), *Fluminicola seminalis* (nugget pebblesnail), *Fluminicola potemicus* (Potem Creek pebblesnail), and *Fluminicola multifarius* (Shasta pebblesnail)as Endangered or Threatened and designation of Critical Habitat = **listing not warranted at this time**

- JUSTIFICATION: Listing of *Juga* new species (n. sp.) 2 (basalt juga), *Juga* n. sp. 3 (cinnamon juga), *Colligyrus* n. sp. 1 (Columbia duskysnail), *Fluminicola* n. sp. 11 (Fredenburg pebblesnail), *Fluminicola* n. sp. 3 (Klamath Rim pebblesnail), *Vorticifex* n. sp. 1 (knobby rams-

horn), *Colligyrus* n. sp. 2 (masked duskysnail), and *Fluminicola* n. sp. 2 (tall pebblesnail) is not warranted at this time because these snails do not constitute listable entities under the Act; Listing of *Colligyrus convexus* (canary duskysnail), *Fluminicola anserinus* (Goose Valley pebblesnail), *Fluminicola umbilicatus* (Hat Creek pebblesnail), *Fluminicola seminalis* (nugget pebblesnail), *Fluminicola potemicus* (Potem Creek pebblesnail), and *Fluminicola multifarius* (Shasta pebblesnail) is not warranted at this time because they do not meet the criteria for listing.

- RESULTS: CLOSED.
- LINK: http://www.fws.gov/policy/library/2012/2012-22723.pdf

Pseudotryonia adamantina (Diamond Y springsnail), *Pyrgulopsis texana* (Phantom Cave snail), *Tryonia circumstriata* (Gonzales springsnail), *Tryonia cheatumi* (Phantom springsnail)

- POSTED: August 16, 2012

- SUMMARY: <u>Proposed Rule</u> to list *Pseudotryonia adamantine* (Diamond Y springsnail), *Pyrgulopsis texana* (Phantom Cave snail), *Tryonia circumstriata* (Gonzales springsnail), *Tryonia cheatumi* (Phantom springsnail) as Endangered or Threatened and designate Critical Habitat = **proposal initiated**

- JUSTIFICATION: To be determined.
- RESULTS: Information is solicited (submission deadline October 15, 2012).
- LINK: <u>http://www.fws.gov/policy/library/2012/2012-19829.pdf</u>

Newcombia cumingi (Newcomb's treesnail), Partulina semicarinata (Lanai tree snail), Partulina variabilis (Lanai treesnail)

- POSTED: August 9, 2012

- SUMMARY: Proposed Rule to list 38 species of plants and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's Treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] as Endangered; reaffirm listing of 2 endemic Hawaiian plant species currently listed as Endangered; designate Critical Habitat for 39 of these plant and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] on the Hawaiian Islands of Molokai, Lanai, and Maui; designate Critical Habitat for 11 plant and animal species [no mollusks] already listed as Endangered; and revise Critical Habitat for 85 plant and animal species already listed as Endangered or Threatened on the Hawaiian Islands of Molokai, Lanai, Maui, and Kahoolawe = comment period reopened

- JUSTIFICATION: To be determined. Also 85 plant species
- RESULTS: Original proposal June 11, 2012 and Draft Economic Analysis (DEA)
- produced. Public comments solicited (submission deadline September 10, 2012).
- LINK: http://www.fws.gov/policy/library/2012/2012-19487.pdf

Sonorella magdalenensis (Sonoran talussnail)

- POSTED: July 24, 2012

- SUMMARY: <u>Proposed Rule Notice of 90-day Petition Finding</u> to list *Sonorella magdalenensis* (Sonoran talussnail) as Endangered or Threatened with Critical Habitat designated = <u>listing is warranted and status review initiated</u>

- JUSTIFICATION: To be determined.

- RESULTS: Review of finding initiated. Public comments solicited (submission deadline January 14, 2013).

- LINK: <u>http://www.fws.gov/policy/library/2012/2012-17938.pdf</u>

Pyrgulopsis chupaderae (Chupadera springsnail)

- POSTED: July 12, 2012

- SUMMARY: <u>Final Rule</u> to list *Pyrgulopsis chupaderae* (Chupadera springsnail) as Endangered with Critical Habitat designated = <u>species listed as Endangered and Critical</u> <u>Habitat designated</u>

- JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; and (D) the inadequacy of existing regulatory mechanisms.

- RESULTS: CLOSED
- LINK: http://www.fws.gov/policy/library/2012/2012-16988.pdf

Inflectarius magazinensis (Magazine Mountain shagreen) [formerly Mesodon magazinensis]

- POSTED: June 19, 2012

- SUMMARY: <u>Proposed Rule</u> to delist *Inflectarius magazinensis* (Magazine Mountain shagreen) [formerly *Mesodon magazinensis*] from the Federal List of Endangered and Threatened Wildlife = <u>delisting is warranted</u>

- JUSTIFICATION: all of the threats to the species have been eliminated or reduced, adequate regulatory mechanisms exist, and populations are stable so that the species is not currently, and is not likely to again become, a threatened species within the foreseeable future in all or a significant portion of its range.

- RESULTS: Public comments solicited (submission deadline August 3, 2012).

- LINK: http://www.fws.gov/policy/library/2012/2012-14502.pdf

Newcombia cumingi (Newcomb's treesnail), Partulina semicarinata (Lanai tree snail), Partulina variabilis (Lanai treesnail)

- POSTED: August 9, 2012

- SUMMARY: Proposed Rule to list 38 species of plants and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] as Endangered; reaffirm listing of 2 endemic Hawaiian plant species currently listed as Endangered; designate Critical Habitat for 39 of these plant and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] on the Hawaiian Islands of Molokai, Lanai, and Maui; designate Critical Habitat for 11 plant and animal species [no mollusks] already listed as Endangered; and revise Critical Habitat for 85 plant and animal

species already listed as Endangered or Threatened on the Hawaiian Islands of Molokai, Lanai, Maui, and Kahoolawe = <u>comment period reopened</u>

- JUSTIFICATION: To be determined. Also 85 plant species
- RESULTS: Original proposal June 11, 2012 and Draft Economic Analysis (DEA)

produced. Public comments solicited (submission deadline September 10, 2012).

LINK: http://www.fws.gov/policy/library/2012/2012-19487.pdf

Newcombia cumingi (Newcomb's treesnail), Partulina semicarinata (Lanai tree snail), Partulina variabilis (Lanai treesnail)

- POSTED: June 11, 2012

- SUMMARY: <u>Proposed Rule</u> to list 38 species of plants and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] as Endangered; reaffirm listing of 2 endemic Hawaiian plant species currently listed as Endangered; designate Critical Habitat for 39 of these plant and animal species [including 3 mollusks: *Newcombia cumingi* (Newcomb's treesnail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail), *Partulina semicarinata* (Lenai tree snail), *Partulina variabilis* (Lanai tree snail)] on the Hawaiian Islands of Molokai, Lanai, and Maui; designate Critical Habitat for 11 plant and animal species [no mollusks] already listed as Endangered; and revise Critical Habitat for 85 plant and animal species already listed as Endangered or Threatened on the Hawaiian Islands of Molokai, Lanai, Maui, and Kahoolawe = **proposal initiated**

- JUSTIFICATION: To be determined.

- RESULTS: USFWS proposed listing. Comments solicited (submission deadline August 10, 2012)

- LINK: http://www.fws.gov/policy/library/2012/2012-11484.pdf

Pyrgulopsis chupaderae (Chupadera springsnail)

- POSTED: May 1, 2012

- SUMMARY: <u>Proposed Rule</u> to list Pyrgulopsis chupaderae (Chupadera springsnail) as Endangered with Critical Habitat designated = <u>comment period reopened</u>

- JUSTIFICATION: To be determined.
- RESULTS: Public comments solicited (submission deadline May 16, 2012).
- LINK: http://www.fws.gov/policy/library/2012/2012-10451.pdf

Pyrgulopsis trivialis (Three Forks springsnail) and *Pyrgulopsis bernardina* (San Bernardino springsnail)

- POSTED: April 17, 2012

- SUMMARY: <u>Final Rule</u> to list *Pyrgulopsis trivialis* (Three Forks springsnail) as Endangered and *Pyrgulopsis bernardina* (San Bernardino springsnail) as Threatened = <u>Pyrgulopsis trivialis listed as Endangered, Pyrgulopsis bernardina listed as Threatened and</u> <u>Critical Habitat designated</u>

- JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (D) The inadequacy of existing regulatory mechanisms; and (E). Other natural or manmade factors.

- RESULTS: CLOSED
- LINK: <u>http://www.fws.gov/policy/library/2012/2012-8811.pdf</u>

Margaritifera marrianae (Alabama pearlshell), Fusconaia rotulata (round ebonyshell), Ptychobranchus jonesi (southern kidneyshell), Villosa choctawensis (Choctaw bean), Fusconaia burkei (tapered pigtoe), Fusconaia escambia (narrow pigtoe), Hamiota australis (southern sandshell), and Pleurobema strodeanum (fuzzy pigtoe)

- POSTED: March 27, 2012

- SUMMARY: <u>Proposed Rule</u> to list *Margaritifera marrianae* (Alabama pearlshell), *Fusconaia rotulata* (round ebonyshell), *Ptychobranchus jonesi* (southern kidneyshell) and *Villosa choctawensis* (Choctaw bean) as Endangered and designate Critical Habitat = <u>comment</u> <u>period reopened</u>; <u>Proposed Rule</u> to list *Fusconaia burkei* (tapered pigtoe), *Fusconaia escambia* (narrow pigtoe), *Hamiota australis* (southern sandshell), and *Pleurobema strodeanum* (fuzzy pigtoe) as Threatened throughout their ranges = <u>comment period reopened</u>

- JUSTIFICATION: To be determined.
- RESULTS: Comments solicited (submission deadline April 26, 2012)
- LINK: http://www.fws.gov/policy/library/2012/2012-7200.pdf

Cumberlandia monodonta (spectacle case) and Plethobasus cyphyus (sheepnose)

- POSTED: March 13, 2012

- SUMMARY: <u>Final rule</u> to list *Cumberlandia monodonta* (spectacle case) and *Plethobasus cyphyus* (sheepnose) as Endangered with designation of Critical Habitat = <u>species</u> **listed as Endangered and Critical Habitat NOT designated**

- JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (D) The inadequacy of existing regulatory mechanisms; and (E) Other natural or manmade factors.

- RESULTS: CLOSED
- LINK: <u>http://www.fws.gov/policy/library/2012/2012-5603.pdf</u>

Villosa fabalis (rayed bean) and Epioblasma triquetra (snuffbox)

- POSTED: February 14, 2012

- SUMMARY: <u>Final Rule</u> to list *Villosa fabalis* (rayed bean) and *Epioblasma triquetra* (snuffbox) as Endangered with designation of Critical Habitat = <u>species listed as Endangered</u>

- JUSTIFICATION: This finding is based on information provided under factors (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (D) The inadequacy of existing regulatory mechanisms; and (E) Other natural or manmade factors.

- RESULTS: CLOSED
- LINK: <u>http://www.fws.gov/policy/library/2012/2012-2940.pdf</u>

Pyrgulopsis chupaderae (Chupadera springsnail)

- POSTED: January 20, 2012

- SUMMARY: <u>Proposed Rule</u> to list *Pyrgulopsis chupaderae* (Chupadera springsnail) as Endangered with Critical Habitat designated = <u>comment period reopened</u>

- JUSTIFICATION: To be determined.
- RESULTS: Public comments solicited (submission deadline February 21, 2012)
- LINK: <u>http://www.fws.gov/policy/library/2012/2012-1147.pdf</u>

This summarizes the legislative actions issued during 2012. Please look for quarterly updates on ongoing legislation. A 2013 summary will be provided in January or February. Please help make a difference by commenting on proposals within the appropriate comment period and becoming involved with your local natural heritage program and state fish and wildlife office staff.

Regards,

Jay Jay Cordeiro UMass Boston Northeast Natural History & Supply Contact: jay.cordeiro@umb.edu