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- **PRINCIPLES OF ECOLOGY**
 - **BIOLOGY 215 (10317)**
 - **Sept 2018**

- **INSTRUCTOR: Dr. T. E. Reimchen**

- **Office: Cunn 056, Ph 721-7101**

- **SENIOR LAB COORDINATOR: Dr. Neville Winchester**

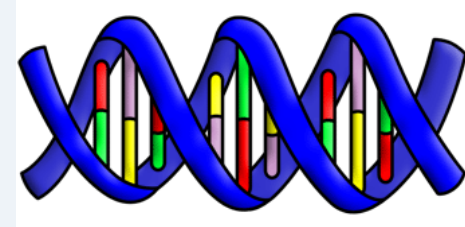
- **Office : Cun 232b Ph. 721-7099, winchest@uvic.ca**

- **Lectures MR: 0830-0950, David Turpin Building A120**

- **Labs: Cunn 245**

- Course Outline

- Ecological genetics –genetic variability, natural selection, evolution, geological timetable

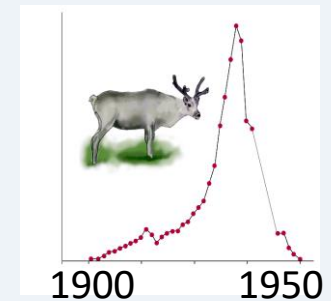


- Behavioral ecology- optimal foraging, territoriality, sex & mating systems, group living, life histories



- Population ecology- movement, estimating population size, life tables, mortality and survivorship curves, ~~population growth and~~ population regulation

$$\frac{dN}{dt} = rN \frac{(K - N)}{K}$$



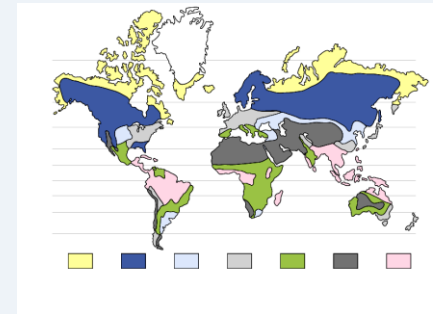
Ecological interactions- competition, niche, predation, defenses



Community ecology- succession, trophic levels, nutrient cycling, keystone species



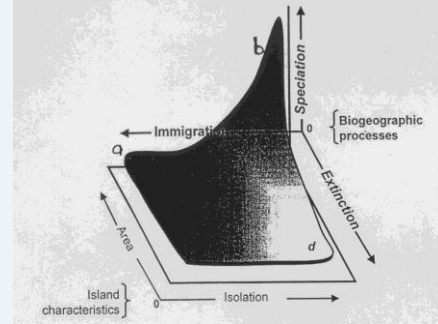
Major ecological communities- estuaries, intertidal, kelp forests, pelagic, deep sea, coral reefs, lakes, tundra, taiga, temperate forests, grasslands, deserts, tropical forests



Global biodiversity- latitude, elevation, ocean depth causes: evapotranspiration, spatial heterogeneity, geological history, complexity, stability



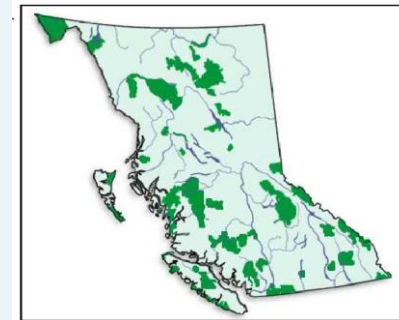
Island biogeography – island size, distance, species turnover, equilibrium & tripartite theory



Human impact on ecosystems – population growth, habitat loss, fragmentation, atmospheric pollutants, global warming, freshwater and marine pollution, ocean acidification, overhunting, overfishing, introduced species, extinctions



Conservation ecology- history, ecological footprint, IUCN categories, benefits and limitations of protected areas, SLOSS, minimum viable population (MVP), minimum viable area(MVA), critical habitats, hotspots, endemic species, park design, restoration



The future



DATE (WEEK OF)	LAB #	LAB CONTENT
September 10	1	Ecological sampling: herbivory and Garry Oak Ecosystems
September 17	2	Morphological variation: Ecological adaptations of <i>Nucella lamellosa</i> , confidence limits, histograms, bar charts, summary statistics
September 24	3	Predator/Prey: Orb-weaving spiders Quadrat sampling, Transect sampling
October 1	4	Mark and Recapture <i>Hemigrapsus</i> , sp. Quiz 1
October 8	5	Thanksgiving – No Labs
October 15	6	Lab midterm exam
October 22	7	Dietary analysis coastal wolves
October 29	8	Island Biogeography – Beetles and forest patches
November 5	9	Exploring principles of community diversity: Soil litter/edge part 1
November 12	10	Reading Break – No Labs
November 19	11	Soil litter/edge, diversity indices, part 2 Quiz 2
November 26	12	Lab final exam

LABORATORY MARK DISTRIBUTION (40% of the course mark)

Laboratory Quiz 1	Week of October 1	Mark	5.0%
Laboratory Quiz 2	Week of November 19	Mark	5.0%
Laboratory midterm exam:	Week of October 15	Mark	15.0%
Laboratory final lab exam:	Week of November 26	Mark	15.0%

Total laboratory mark: **Total 40.0%**

Note 1: The laboratory final exam is cumulative. The quizzes will be based on your lab modules and are not cumulative.

- Lectures
- Introduction
- Ecological genetics
- Behavioral ecology
- Population ecology
- Ecological interactions
- Community ecology
- Major ecological communities
- Global biodiversity
- Island biogeography
- Human impact on ecosystems
- Conservation ecology
- The future

Lectures- 60% of course mark

Midterm exam*: 25% Oct 18

Final*: 35% (not cumulative)

Labs-40% of course mark

- **Lecture Text: -recommended but not required**
- **- Molles, Cahill and Laursen 2017- Ecology (Canadian Edition) –**
- **-limited quantity in bookstore**
- **Ecology Texts In Reserve Reading Room, McPherson Library**
- **Stiles; Freedman; Molles; Ricklefs ; Wilson**
- -pdfs of most lecture slides on CourseSpaces website within 6 hours following the lecture
- -lecture pdfs limited to personal use and not for redistribution
- -Access to 215 website restricted to registered students with a UVic email account.
- **Electronic Lab Manual/Modules-** required (approx. \$12.50@bookstore)
- -bring memory stick to each lab

Documentaries – David Attenborough, example... Planet Earth I&II, Blue Planet I&II, etc

****** Oceans: Our Blue Planet (currently showing in the IMAX at the RBC Museum)**

Additional readings to supplement lecture topics: examples- New Scientist, Conservation Biology, Ecology, Trends in Ecology and Evolution, Scientific American, Web of Science, Google Scholar, Google, Wikipedia

General information:

Students not wanting their marks posted using ID# should notify me at the beginning of the term. It is the student's responsibility to meet the ADD/DROP dates from the UVic calendar. Students are responsible for checking their own records and registration status. A supplementary exam is not permitted for those who get less than 50% in the combined lecture exams.

- interesting and important topics- class discussions**
- sample exam questions given every week in lectures**
- typically, grades are directly related to attendance**
- late arrivals? early departures? social media? chatting?**
- exam deferral only with medical justification**

I do not answer emails concerning lecture content but have an open door policy for questions. Feel free to visit my office anytime apart from Monday and Thursday prior to 1400hrs. If I am not there, check back later.

Sept 18: Last day for 100% reduction of tuition fees for standard first term and full year courses. 50% of tuition fees will be assessed for courses dropped after this date

Sept 21: Last day for adding courses that begin in the first term

Sept 30: Last day for paying first term fees without penalty

Oct 09: Last day for 50% reduction of tuition fees. 100% of tuition fees will be assessed for courses dropped after this date

Oct 18: Lecture mid-term exam

Oct 31: Last day for withdrawing from first term courses without penalty of failure

Dec 03: Last lecture in Biol215

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Literature searches????

Ocean plastics



ocean plastics



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<https://www.plasticoceans.org/> ▼

The **Plastic Oceans** Foundation is a global non-profit organization dedicated to protecting our **oceans** from **plastic** pollution.

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The Facts - Plastic Oceans

<https://www.plasticoceans.org/the-facts/> ▼

The proliferation of **plastic** products in the last 70 years or so has been extraordinary; quite simply we cannot now live without them. We are now producing ...



ocean plastics



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How Much Trash Is In Our Ocean? | 4 Ocean Bracelets - 4Ocean

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Articles

About 113,000 results (0.03 sec)

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 include patents include citations Create alert**Bottles, bags, ropes and toothbrushes: the struggle to track ocean plastics**

D Cressey - Nature News, 2016 - nature.com

From Arctic to Antarctic, from surface to sediment, in every marine environment where scientists have looked, they have found plastic. Other human-generated debris rots or rusts away, but **plastics** can persist for years, killing animals, polluting the environment and blighting coastlines. By some ...

☆ Cited by 19 Related articles All 10 versions

Organic micropollutants in marine plastics debris from the open ocean and remote and urban beaches

H Hirai, H Takada, Y Ogata, R Yamashita... - Marine Pollution ..., 2011 - Elsevier

To understand the spatial variation in concentrations and compositions of organic micropollutants in marine plastic debris and their sources, we analyzed plastic fragments (~10 mm) from the open **ocean** and from remote and urban beaches. Polychlorinated ...

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Plastic waste inputs from land into the ocean

JR Jambeck, R Geyer, C Wilcox, TR Siegler... - ..., 2015 - science.sciencemag.org

... Although these **ocean** estimates represent only **plastics** that are buoyant in seawater (mainly polyethylene and polypropylene), in 2010 those resins accounted for 53% of plastic production in North America and 66% of plastic in the US waste stream (4, 18) ...

☆ Cited by 1146 Related articles All 25 versions

The vertical distribution of buoyant plastics at sea: an observational study in the North Atlantic Gyre

JW Reisser, B Slat, KD Noble, KD Plessis, M Epp... - 2015 - repositorio.furg.br

... It also provides the first measurements of the rise velocity of **ocean plastics**, which varies with particle size and type ... Subsurface sam- ples are still scarce and the processes influencing





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11. **Microplastic ingestion by *Daphnia magna* and its enhancement on algal growth**

By: Canniff, Patrick M.; Hoang, Tham C.

SCIENCE OF THE TOTAL ENVIRONMENT Volume: 633 Pages: 500-507 Published: AUG 15 2018

[View Abstract ▾](#)

12. **Microplastics in surface waters of Dongting Lake and Hong Lake, China**

By: Wang, Wenfeng; Yuan, Wenke; Chen, Yuling; et al.

SCIENCE OF THE TOTAL ENVIRONMENT Volume: 633 Pages: 539-545 Published: AUG 15 2018

[View Abstract ▾](#)

13. **Lost but can't be neglected: Huge quantities of small microplastics hide in the South China Sea**

By: Cai, Minggang; He, Haixia; Liu, Mengyang; et al.

SCIENCE OF THE TOTAL ENVIRONMENT Volume: 633 Pages: 1206-1216 Published: AUG 15 2018

[View Abstract ▾](#)

14. **Microplastics in the environment: Challenges in analytical chemistry A review**

By: Silva, Ana B.; Bastos, Ana S.; Justino, Celine I. L.; et al.

ANALYTICA CHIMICA ACTA Volume: 1017 Pages: 1-19 Published: AUG 9 2018

[View Abstract ▾](#)

Retention of microplastics in a major secondary wastewater treatment plant in Vancouver, Canada

By: Gies, EA (Gies, Esther A.)^[1,2]; LeNoble, JL (LeNoble, Jessica L.)^[1]; Noel, M (Noel, Marie)^[1]; Etemadifar, A (Etemadifar, Anahita)^[1]; Bishay, F (Bishay, Farida)^[3]; Hall, ER (Hall, Eric R.)^[2]; Ross, PS (Ross, Peter S.)^[1]

MARINE POLLUTION BULLETIN

Volume: 133 **Pages:** 553-561

DOI: 10.1016/j.marpolbul.2018.06.006

Published: AUG 2018

Document Type: Article

[View Journal Impact](#)

Abstract

Municipal wastewater treatment plants (WWTPs) are conduits through which microplastics (MPs) are released into aquatic environments. However, the technical challenges in working with wastewater sample matrices have precluded reliable particle count budget calculations. We applied newly-adapted methods for MP collection and analysis to a study of a major WWTP serving a population of 1.3 million people near Vancouver, Canada. Suspected MP particles, including fibres, were counted and categorized using light microscopy in influent, primary effluent, secondary effluent, primary sludge and secondary sludge. Fourier Transform Infrared Spectroscopy (FT-IR) confirmed that just 32.4% of the suspected MPs were plastic polymers. Using FT-IR corrected data, we estimate that 1.76 +/- 0.31 trillion MPs enter the WWTP annually, with 1.28 +/- 0.54 trillion MPs settling into primary sludge, 0.36 +/- 0.22 into secondary sludge, and 0.03 +/- 0.01 trillion MPs released into the receiving environment. This corresponds to a retention of microplastics of up to 99% in the WWTP.