NREM 691: Valuing Nature

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**Course Site:** will be held on D2L once UH moves from Laulima

**MEM Concentration Track:** b)Environmental Policy & Economics.

### I.    Course description

This course introduces empirical methods at the current frontiers of research in environmental valuation which relies heavily on environmental and resource economics. This fulfils a concentration area of MEM students seeking Environmental Policy & Economics. General topics include the identification of non-market values, revealed, and stated preference methods, environmental policy evaluation, land-use modeling, and climate econometrics.

**Prerequisites:**

Students should be familiar with treatment of micro theory and econometrics. Past training in environmental economics, econometrics, and experience with statistical software and programming will be useful but is not required.

### II.    Course Content and Learning Objectives

My objectives for this course are to:

1. Provide students with a solid foundation in the recent advances in the empirical methods related to the valuation of environmental goods and services.
2. Increase students’ ability to define empirical environmental and resource economic problems, analyze information, and develop research questions.
3. Provide students with a foundation for conducting applied research in environmental and resource using sound practices in both academia and policy (e.g M.S Thesis or Ph.D. dissertation)

And to satisfy NREM Graduate Student Learning Outcomes (SLO's):

1. Students can analyze and address natural resource and environmental management problems by using appropriate methods from social and/or natural science disciplines
2. Students communicate effectively, both orally and in writing, to diverse audiences including professionals, resource managers, local communities and policy makers

[**NREM Graduate Student Learning Outcomes**](https://cms.ctahr.hawaii.edu/nrem/GRADUATE#:~:text=The%20NREM%20graduate%20program%20brings,land%2D%20and%20sea%2Dscapes.)

As well as additional student outcomes:

1. Pursue research on a range of topics in environmental economics and non-market valuation and, for those seeking employment in academia, teach a similar course to this one in the future.
2. Explain the models of non-market valuation and have the foundational knowledge to understand the challenges and apply the methods to environmental and resource issues.
3. Describe and critically evaluate the empirical evidence relevant to the application of models to environmental and natural resource issues.
4. Frame and discuss environmental and resource issues and the current policies treatment of these resources in policy decision-making.

### III.     Course Information, Policies and Resources

1. **Late Work Policy:**  Late work will receive a 10% deduction for each day it’s late (so on day 10 it’s worth 0%). Extensions can delay this, but I reserve them for emergencies/unforeseen circumstances outside the student’s control.
2. **Attendance policy:** Students who are enrolled in this course, but never attend will be flagged by the course instructor for non-participation before the last day to add/drop (for 100% tuition refund) deadline. Flagged students will be administratively dropped by the Office of the Registrar. Any changes to a student’s enrollment status may affect financial aid eligibility and can result in the return of some of all of federal student financial aid.
3. **Artificial intelligence (AI)** Students are permitted to integrate AI into some substantive tasks, such as data analysis, code and text generation, or spreadsheet creation. Students are not allowed to use AI to write reports or assignment. AI produces a lot of slop content and I do not find it beneficial for me or for you to be grading a robot. I would prefer unpolished work versus generated repetitive and unoriginal work. Follow guidance of AI at <https://manoa.hawaii.edu/ovpae/guidance-on-ai/>.
4. **Statement on Disability: KOKUA Program** (text to be used) If you have a disability and related access needs, please contact the KOKUA Program (Office for Students with Disabilities) at 956-7511, KOKUA@hawaii.edu, or go to Room 013 in the Queen Lili‘uokalani Center for Student Services. Please know that I will work with you and KOKUA to meet your access needs based on disability documentation. Kokua’s services are confidential and offered free of charge.
5. **Academic Integrity and Ethical Behavior: Office of Student Conduct**Cheating, plagiarism, or other forms of academic dishonesty are not permitted within this course and are prohibited within the System-wide Student Conduct Code (EP 7.208). Examples include: fabrication, falsification, cheating, plagiarism, and use of improper materials. Any incident of suspected academic dishonesty will be reported to the Office of Student Conduct for review and possible adjudication. Additionally, the instructor may take action in regards to the grade for the deliverable or course as they see fit.
6. **Office of Title IX**:  (808) 956-2299 / [t9uhm@hawaii.edu](mailto:t9uhm@hawaii.edu) / <https://manoa.hawaii.edu/titleix/>
7. **Department of Public Safety**: (808)956-6911 (Emergency) / (808)956-8211 (Non-Emergency) <http://manoa.hawaii.edu/dps/>
8. **UH System Basic Needs**(text to be used) include food and housing, childcare, mental health, financial resources and transportation, among others. Student basic needs security is critical for ensuring strong academic performance, persistence and graduation and overall student well being. If you or someone you know are experiencing basic needs insecurity, please see the following resources: [UH System Basic Needs](https://www.hawaii.edu/student-basic-needs/resources/manoa/)

### IV.    Course Assignments, Evaluation and Grading

*Participation* 25%

This course is designed to provide seminar-style discussion of journal articles at the frontier of research in environmental valuation. For this to be successful, active participation in class discussion is necessary and expected.

Additionally, the NREM and Economic department conduct weekly seminars. NREM has seminars on Wednesday at 3:30 often focused on topics pertaining to management questions. The [Workshop Environmental and Energy Presentation (WEER)](https://uhero.hawaii.edu/workshop-on-energy-and-environmental-research/) in the Econ department meets each Monday at noon during the semester. Each student is encouraged to *attend every* seminar. The participation requirement here is to submit a one-page summary/critique of three (3) presentations. See Seminar Summary assignment on site website for more details.

*Student Lecture* 25%

Each student will be assigned two (2) empirical papers to prepare a Full Class lecture to the class. Potential papers for each topic are indicated in the reading list below with an asterisk (\*). See Student Lecture assignment on site website for more details.

*Referee Reports* 15%

Each student will be assigned two (2) working papers to prepare a referee report to a journal editor. You will be asked to summarize the paper, list and discuss the major strengths and weaknesses, and make a recommendation in which quality tier a paper should be published. Reports will be used in this course to gain experience in critically studying papers. **See Referee Report assignment on site website for more details.**

Referee Report #1: Due Sunday October 6th @ 11:55 pm

Referee Report #2: Due Sunday November 10th @ 11:55 pm

*Research Assignment: 35 %*

Research assignment will focus on specific modeling framework during the quarter. Actual data and a set of assignments are assigned and will vary based on the framework. Depending on the size of the class we will have 2 or 3 groups. Each group will be responsible for preparation of a final paper and an in-class presentation during the final exam period. The three main frameworks:

#1: Discrete Choice Modeling

#2: Recreation Demand Modeling

#3: Hedonic Property Value Modeling

### V.     Learning Material

**Learning Resources:** The readings for this course are primarily journal articles. There are **no required textbooks** for this course, but this reference could provide helpful:

* Perrings, Charles, and Ann Kinzig. *Conservation: Economics, science, and policy*. Oxford University Press, 2021.
* Peterson, L. G. (2003). *A primer on nonmarket valuation* (Vol. 3, pp. 72-82). P. A. Champ, K. J. Boyle, & T. C. Brown (Eds.). Dordrecht: Kluwer Academic Publishers.
* Phaneuf & Requate: *A Course in Environmental Economics; Theory, Policy, and Practice*
* Bockstael & McConnell, *Environmental & Resource Valuation w/ Revealed Preferences*

**Primarily journal articles:**

*All of the content can be available to downloaded from course site or from the University of Manoa Library*

**Part I: Environmental Economics**

Cropper, M. L., & Oates, W. E. (1992). Environmental economics: a survey. *Journal of economic literature*, *30*(2), 675-740.

McCarthy, G. (2019). The role of environmental economics in US environmental policy. *Review of Environmental Economics and Policy*.

**Part II: Identification of Nonmarket Values**

**Foundations of Nonmarket Valuation**

Segerson, K. (2017). Valuing environmental goods and services: an economic perspective. *A primer on nonmarket valuation*, 1-25.

Flores, N. E. (2017). Conceptual framework for nonmarket valuation. *A primer on nonmarket valuation*, 27-54.

**Part III: Stated Preferences**

Kling, C. L., Phaneuf, D. J., & Zhao, J. (2012). From Exxon to BP: Has some number become better than no number?. *Journal of Economic Perspectives*, *26*(4), 3-26.

**Contingent Valuation**

Boyle, K. J. (2017). Contingent valuation in practice. *A primer on nonmarket valuation*, 83-131.

Arrow, K., Solow, R., Portney, P. R., Leamer, E. E., Radner, R., & Schuman, H. (1993). Report of the NOAA panel on contingent valuation. *Federal register*, *58*(10), 4601-4614.

**\* Samples, K. C., & Hollyer, J. R. (2019). Contingent valuation of wildlife resources in the presence of substitutes and complements. In *Economic Valuation of Natural Resources* (pp. 177-192). Routledge.**

**\* Andrade, G., Itoga, H., Linnes, C., Agrusa, J., & Lema, J. (2021). The economic sustainability of culture in Hawai’i: tourists’ willingness to pay for Hawaiian cultural experiences. *Journal of Risk and Financial Management*, *14*(9), 420.**

**\*Lorber, Connor, Ruth Dittrich, Sharon Jones, and Alex Junge. "Is hiking worth it? A contingent valuation case study of Multnomah Falls, Oregon." *Forest Policy and Economics* 128 (2021): 102471.**

**Discrete Choice (Choice Experiment)**

Holmes, T. P., Adamowicz, W. L., & Carlsson, F. (2017). Choice experiments. *A primer on nonmarket valuation*, 133-186.

**\*Wallmo, K., & Lew, D. K. (2011). Valuing improvements to threatened and endangered marine species: an application of stated preference choice experiments. *Journal of environmental management*, *92*(7), 1793-1801.**

**\*Robinson, P. J., van Beukering, P., Brander, L., Brouwer, R., Haider, W., Taylor, M., & Mau, P. (2022). Understanding the determinants of biodiversity non-use values in the context of climate change: Stated preferences for the Hawaiian coral reefs. *Ecosystem Services*, *53*, 101393.**

**\*Hashida, Y., & Lewis, D. J. (2022). Estimating welfare impacts of climate change using a discrete-choice model of land management: An application to western US forestry. *Resource and Energy Economics*, *68*, 101295.**

**\*Penn, J., Hu, W., Cox, L., & Kozloff, L. (2016). Values for recreational beach quality in Oahu, Hawaii. *Marine Resource Economics*, *31*(1), 47-62.**

**\*Peng, M., & Oleson, K. L. (2017). Beach recreationalists' willingness to pay and economic implications of coastal water quality problems in Hawaii. *Ecological economics*, *136*, 41-52.**

**Part IV: Revealed Preferences**

Bateman, I. J., & Kling, C. L. (2020). Revealed preference methods for nonmarket valuation: An introduction to best practices. *Review of Environmental Economics and Policy*.

Lupi, F., Phaneuf, D. J., & von Haefen, R. H. (2020). Best practices for implementing recreation demand models. *Review of Environmental Economics and Policy*.

**Hedonic Methods**

Taylor, L. O. (2017). Hedonics. *A primer on nonmarket valuation*, 235-292.

Bishop, K. C., Kuminoff, N. V., Banzhaf, H. S., Boyle, K. J., von Gravenitz, K., Pope, J. C., ... & Timmins, C. D. (2020). Best practices for using hedonic property value models to measure willingness to pay for environmental quality. *Review of Environmental Economics and Policy*.

Evans, M. F., & Taylor, L. O. (2020). Using revealed preference methods to estimate the value of reduced mortality risk: Best practice recommendations for the hedonic wage model. *Review of Environmental Economics and Policy*.

\***Tarui, N., Urbanski, S., Lam, Q. L., Coffman, M., & Newfield, C. (2023). Sea level rise risk interactions with coastal property values: a case study of O ‘ahu, Hawai ‘i. *Climatic Change*, *176*(9), 130.**

**\* Gopalakrishnan, S., Smith, M. D., Slott, J. M., & Murray, A. B. (2011). The value of disappearing beaches: A hedonic pricing model with endogenous beach width. *Journal of Environmental Economics and Management*, *61*(3), 297-310.**

**\*Dundas, S. J., & Lewis, D. J. (2020). Estimating option values and spillover damages for coastal protection: Evidence from Oregon’s Planning Goal 18. *Journal of the Association of Environmental and Resource Economists*, *7*(3), 519-554.**

**\*Hashida, Y., & Dundas, S. J. (2023). The effects of a voluntary property buyout and acquisition program on coastal housing markets: Evidence from New York. *Journal of Environmental Economics and Management*, *121*, 102873.**

**\* Zabel, J., Nolte, C., & Paterson, R. (2024). Measuring the Value of US National Parks Using Hedonic Property Value Models. *Land Economics*, *100*(1), 176-199.**

**Travel Cost Method**

Parsons, G. R. (2017). Travel cost models. *A primer on nonmarket valuation*, 187-233.

English, E., von Haefen, R. H., Herriges, J., Leggett, C., Lupi, F., McConnell, K., ... & Meade, N. (2018). Estimating the value of lost recreation days from the Deepwater Horizon oil spill. *Journal of Environmental Economics and Management*, *91*, 26-45.

Keeler, B. L., Wood, S. A., Polasky, S., Kling, C., Filstrup, C. T., & Downing, J. A. (2015). Recreational demand for clean water: evidence from geotagged photographs by visitors to lakes. *Frontiers in Ecology and the Environment*, *13*(2), 76-81.

**\*Dundas, S. J., & von Haefen, R. H. (2020). The effects of weather on recreational fishing demand and adaptation: implications for a changing climate. *Journal of the Association of Environmental and Resource Economists*, *7*(2), 209-242.**

**\*Lloyd-Smith, P., & Becker, M. (2020). The Economic Value of Camping Using Administrative Data. *Journal of Agricultural and Resource Economics*, *45*(3), 445-46**

**\*Gellman, J., Walls, M. A., & Wibbenmeyer, M. (2023). *Welfare Losses from Wildfire Smoke: Evidence from Daily Outdoor Recreation Data* (No. 23-31). Resources for the Future.**

**\*Fezzi, C., Ford, D. J., & Oleson, K. L. (2023). The economic value of coral reefs: Climate change impacts and spatial targeting of restoration measures. *Ecological Economics*, *203*, 107628.**

**Part V: Benefit Transfer**

Rolfe, J., Johnston, R. J., Rosenberger, R. S., & Brouwer, R. (2015). Introduction: benefit transfer of environmental and resource values. *Benefit Transfer of Environmental and Resource Values: A Guide for Researchers and Practitioners*, CHAPTERS 1-2

Newbold, S., David Simpson, R., Matthew Massey, D., Heberling, M. T., Wheeler, W., Corona, J., & Hewitt, J. (2018). Benefit transfer challenges: perspectives from US practitioners. *Environmental and Resource Economics*, *69*, 467-481.

*Applications:*

**\*Londoño, L. M., & Johnston, R. J. (2012). Enhancing the reliability of benefit transfer over heterogeneous sites: A meta-analysis of international coral reef values. *Ecological Economics*, *78*, 80-89.**

**\*Fitzpatrick, L., Parmeter, C. F., & Agar, J. (2017). Threshold effects in meta-analyses with application to benefit transfer for coral reef valuation. *Ecological Economics*, *133*, 74-85.**

**\*Sinclair, M., Mayer, M., Woltering, M., & Ghermandi, A. (2020). Valuing nature-based recreation using a crowdsourced travel cost method: A comparison to onsite survey data and value transfer. *Ecosystem Services*, *45*, 101165.**

**Part VI: Natural Capital Accounting**

Hein, L., Bagstad, K. J., Obst, C., Edens, B., Schenau, S., Castillo, G., ... & Caparrós, A. (2020). Progress in natural capital accounting for ecosystems. *Science*, *367*(6477), 514-515.

Fenichel, E. P. (2024). A New Era of Economic Measurement for the Environment and Natural Capital. *Review of Environmental Economics and Policy*, *18*(2), 000-000.

***Applications: (TBA)***

**\* Fenichel, E. P., Abbott, J. K., Bayham, J., Boone, W., Haacker, E. M., & Pfeiffer, L. (2016). Measuring the value of groundwater and other forms of natural capital. *Proceedings of the National Academy of Sciences*, *113*(9), 2382-2387.**

**\* Drupp, M. A., Hänsel, M. C., Fenichel, E. P., Freeman, M., Gollier, C., Groom, B., ... & Venmans, F. (2024). Accounting for the increasing benefits from scarce ecosystems. *Science*, *383*(6687), 1062-1064.**

**\*Capriolo, A., R. G. Boschetto, R. A. Mascolo, S. Balbi, and F. J. E. S. Villa. "Biophysical and economic assessment of four ecosystem services for natural capital accounting in Italy." *Ecosystem Services* 46 (2020): 101207.**

**Part VII: Climate Change Economics**

Nordhaus, W. D. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences*, *114*(7), 1518-1523.

Dundas, S. (2024) Climate Change and Nonmarket Valuation.

**\* Diaz, D., & Moore, F. (2017). Quantifying the economic risks of climate change. *Nature Climate Change*, *7*(11), 774-782.**

**\* Oda, T., Takakura, J. Y., Tang, L., Iizumi, T., Itsubo, N., Ohashi, H., ... & Oki, T. (2023). Total economic costs of climate change at different discount rates for market and non-market values. *Environmental Research Letters*, *18*(8), 084026.**

**\*Dundas, S. J., & von Haefen, R. H. (2021). The importance of data structure and nonlinearities in estimating climate impacts on outdoor recreation. *Natural Hazards*, *107*, 2053-2075.**

**\* Stechemesser, Annika, Nicolas Koch, Ebba Mark, Elina Dilger, Patrick Klösel, Laura Menicacci, Daniel Nachtigall et al. "Climate policies that achieved major emission reductions: Global evidence from two decades." *Science* 385, no. 6711 (2024): 884-892.**

**VI.    Course Assignments, Evaluation and Grading**

1. Assignments
   1. Student Lecture 25%
   2. Referee Reports 20%
   3. Research Assignment: 40 %
2. Assessment of work provided in course content
3. Attendance/Participation expectation
   1. Participation 15%
4. Grading *(letter grade, credit/no credit CR/NC, incomplete I, as applicable)*

|  |  |  |  |
| --- | --- | --- | --- |
| % | Grade | % | Grade |
| 100 | A+ | 73 – 76 | C |
| 93 – 99 | A | 70 – 72 | C- |
| 90 – 92 | A- | 67 – 69 | D+ |
| 87 – 89 | B+ | 63 – 66 | D |
| 83 – 86 | B | 60 – 62 | D- |
| 80 – 82 | B- | <59 | F |
| 77 – 79 | C+ |  |  |

Standard +/- Grading Scale

**VI.    Academic Calendar**

This schedule is subjected to change

| **Week** | **Topic** | **Readings, Assignments, Due Dates** |
| --- | --- | --- |
|  |  |  |
| 8/26 | **Introductions & Environmental Economics** | **Read Part I: Environmental Economics** |
| 8/28 | **Environmental Economics Basics** | **Identify Class Lecture by completing survey** |
| 9/2 | **Foundations of Nonmarket Valuation** | **For Class: Part II: Identification of Nonmarket Values** |
| 9/4 | **Identification of Nonmarket Values & Econometric Basics** | **Due Identify Research Assignment Interest** |
| 9/9 | **Stated Preferences - Intro** | **For Class: Part IV: Stated Preferences Best Practices** |
| 9/11 | **Stated Preferences -**  **Contingent Valuation** | **For Class: Part IV: Stated Preferences: Contingent Valuation** |
| 9/16 | **Stated Preferences -**  **Discrete Choice** | **For Class: Part IV: Stated Preferences: Discrete Choice** |
| 9/18 | **Contingent Valuation (\* Papers)** | Student Presentation |
| 9/23 | **Discrete Choice/Choice Experiment - (\* Papers)** | Student Presentation |
| 9/25 | **Revealed Preferences - Intro** | **For Class: Part III: Revealed Preferences Best Practices** |
| 9/30 | **Revealed Preferences - Types**  **Hedonic** | **For Class: Part III: Revealed Preferences : Hedonic Methods**  Referee Report #1: Due Friday September 24 |
| 10/2 | **Revealed Preferences**  **Travel Cost Method** | **For Class: Part III: Revealed Preferences : Travel Cost Methods** |
| 10/7 | **Hedonic Methods (\* Papers)** | Student Presentation |
| 10/9 | **Travel Cost Method (\* Papers)** | Student Presentation |
| 10/14 | **Benefit Transfer** | **For Class: Part V: Benefit Transfer** |
| 10/16 | **Benefit Transfer** |  |
| 10/21 | **Natural Capital Accounting - Intro** | **For Class: Part VI: Natural Capital Accounting** |
| 10/23 | **Natural Capital Accounting** | Student Presentation |
| 10/28 | **Climate Change Economics - Intro** | **For Class: Part VII: Climate Change Economics** |
| 10/30 | **Climate Change Economics** | Student Presentation |
| 11/4 |  |  |
| 11/6 | **Special Topics** | TBA  Referee Report #2: Due Friday November 12 |
| 11/11 | **Special Topics** | TBA |
| 11/13 | **Special Topics / Research Assignment** |  |
| 11/18 | **Special Topics / Research Assignment** |  |
| 11/25 | **Special Topics / Research Assignment** |  |
| 12/2 |  | Final Research Presentation |
| 12/4 |  | Final Research Presentation |
| 12/10-12/12 | Study Period |  |
| 12/16-12/20 |  | Turn-In Final Research Project |