

# Environmental Sciences and Studies

We must find ways to feed a growing human population while maintaining the natural life support system provided by the Earth's ecosystems; to make built environments more efficient as urban areas continue to grow dramatically in size; and to meet the challenges posed by rising sea-level and increasing global temperatures. These challenges are complex, multifaceted and can best be solved with expertise from multiple, relevant disciplines.

To prepare students to meet these challenges, the Institute at Brown for Environment and Society (IBES) offers two undergraduate degrees: an A.B. in Environmental Sciences and Studies and an Sc.B. in Environmental Sciences and Studies. The A.B. guarantees students have a holistic and interdisciplinary understanding of the environment, while the Sc.B. is a more in-depth treatment of a single field: Climate and Energy; Conservation and Natural Systems; Environmental Justice and Health; or Sustainable Development and Governance. Both degrees provide interdisciplinary exposure to the natural and social sciences, as well as public policy.

Through a rigorous set of core courses; track requirements; and a course, independent research, or project-based capstone experience; our students are primed to make meaningful contributions to environmental scholarship and outreach at local, national and global scales.

If you have administrative questions regarding these concentrations or wish to be added to the email directory listing upcoming events, then please contact Jeanne Loewenstein (jeannel@brown.edu), the academic program manager.

## Standard program in Environmental Sciences and Studies:

The Institute at Brown for Environment and Society administers two concentrations, one an A.B. degree in Environmental Sciences and Studies (**requires 12-13 courses**).

## Requirements for the A.B. Degree

### Core Requirements

ENVS 0490	Environmental Science in a Changing World <sup>1</sup>	1
ENVS 0110	Humans, Nature, and the Environment: Addressing Environmental Change in the 21st Century	1

### Tools - pick one

Courses focused on building qualitative or quantitative research tools		
ANTH 1940	Ethnographic Research Methods	
APMA 0160	Introduction to Scientific Computing	
APMA 0650	Essential Statistics	
APMA 1650	Statistical Inference I	
BIOL 0495	Statistical Analysis of Biological Data	
CSCI 0111	Computing Foundations: Data	
CSCI 0190	Accelerated Introduction to Computer Science	
CLPS 0900	Statistical Methods	
CLPS 0950	Introduction to programming	
DATA 0200	Data Science Fluency	
ECON 0110	Principles of Economics	
ECON 1620	Introduction to Econometrics	
EEPS 0250	Computational Approaches to Modelling and Quantitative Analysis in Natural Sciences: An Introduction	

EEPS 1320	Introduction to Geographic Information Systems for Environmental Applications
EEPS 1330	Global Environmental Remote Sensing
EEPS 1340	Machine Learning for the Earth and Environment
ENVS 1911	Narrating the Anthropocene
SOC 1020	Methods of Social Research
SOC 1100	Introductory Statistics for Social Research
SOC 1117	Focus Groups for Market and Social Research
SOC 1340	Principles and Methods of Geographic Information Systems

### Electives - three courses 3

Any ENVS Course, any course listed in AB focal areas, any course used as a prereq for a concentration requirement, or a Course FOCUSED on the Environment that is approved by the curriculum committee (an environmental section in a course will not count). AB students interested in focusing in a specific discipline are encouraged to take electives in the same category.

### Capstone - one or two courses 1-2

The College expects that a capstone will be completed in semesters 7 or 8 - with the intention of providing an opportunity for students to integrate many aspects of their course of study, or area of focus. This requirement can be met with a two-semester thesis (ENVS 1970 & ENVS 1971), one-semester research project (ENVS 1970 or ENVS 1971), or an approved capstone course.

### Foundations in Earth Sciences and Technology - pick one 1

Courses focusing on earth, atmospheric, engineering or water sciences.	
EEPS 0070	Introduction to Oceanography
EEPS 0160M	Natural Disasters
EEPS 0220	Understanding Earth and Environmental Processes
EEPS 0240	Earth: Evolution of a Habitable Planet
EEPS 0830	Water in Our World
EEPS 0850	Weather and Climate
EEPS 1310	Global Water Cycle
EEPS 1510	Dynamic Meteorology
ENGN 0490	Fundamentals of Environmental Engineering
ENGN 1342	Groundwater Flow and Transport
ENVS 0070G	Historical Climatology and Global Climate Change

### Ecology/Biological Sciences - pick one 1

Courses focused on ecological or conservation biology	
BIOL 0210	Diversity of Life
BIOL 0380	The Ecology and Evolution of Infectious Disease
BIOL 0420	Principles of Ecology
BIOL 0430	The Evolution of Plant Diversity
BIOL 0940D	Rhode Island Flora: Understanding and Documenting Local Plant Diversity
BIOL 1440	Marine Biology
BIOL 1470	Conservation Biology
BIOL 1480	Terrestrial Biogeochemistry and the Functioning of Ecosystems
BIOL 1515	Conservation in the Genomics Age
ENVS 1775	Biogeography

### Environmental Justice and Equity - pick one 1

Courses focused on environmental issues through a justice and/ or equity lens	
ANTH 1601	Reimagining Climate Change

ENVS 0705	Equity and the Environment: Movements, Scholarship, Solutions
ENVS 1232	Land Stewardship, Sovereignty, and Justice
ENVS 1247	Clearing the Air: Environmental Studies of Pollution
ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture
ENVS 0150	Climate Futures and a Sociology of Just Transitions
SOC 0250	An Environmental Sociology for a Rapidly Warming World

**Environmental Policy and Politics - pick one** 1

Courses focused on the policy, politics and/or governance of environmental issues

ANTH 1601	Reimagining Climate Change
ENVS 0715	Political Ecology
ENVS 0717	Ocean Resilience: Ecology, Management, and Politics
ENVS 1350	Environmental Economics and Policy
ENVS 1555	Local Food Systems and Urban Agriculture
ENVS 1574	Climate Policy Research: Organizations and Obstruction
ENVS 1580	Environmental Stewardship and Resilience in Urban Systems
ENVS 1615	Climate Change, Human Rights, and the Policy Process
ENVS 1805	Ocean Governance and Policy
ENVS 1925	Energy Policy and Politics
POLS 1015	Politics and Nature
POLS 1435	Politics of Climate Change
POLS 1822I	Geopolitics of Oil and Energy

**Environmental History and Humanities - pick one** 1

Courses focused on the role of history, culture, and the arts in the environment

ARCH 0680	Water, Culture and Power
ENGL 1160P	Writing Climate, Writing Community
ENGL 1190U	Nature Writing
ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture
ENVS 1557	Birding Communities
ENVS 1825	Commodity Natures: Supply Chains From Extraction to Waste and Alternatives to Endless Growth
ENVS 1910	The Anthropocene: The Past and Present of Environmental Change
ENVS 1916	Animals and Plants in Chinese History
HIST 0270A	From Fire Wielders to Empire Builders: Human Impact on the Global Environment before 1492
HIST 0270B	From the Columbian Exchange to Climate Change: Modern Global Environmental History
HIST 1360	Amazonia from the Prehuman to the Present
HIST 1820B	Environmental History of East Asia
HIST 1974D	The Practice of History
HIST 1976I	Imperialism and Environmental Change
HIST 1976J	Earth Histories: From Creation to Countdown
PHUM 1904	Power + Water: Material Culture and its Environmental Impact

RELS 0260	Religion Gone Wild: Spirituality and the Environment
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**Total Credits** 12-13

<sup>1</sup> The core requirement of ENVS 0490 can be waived for students with an AP exam score of 5 in Environmental Science.

**Honors**

Students interested in graduating with honors in their concentration must complete a thesis determined to be of the highest quality and must have excelled in their coursework required for the concentration, which is defined here as receiving a grade of "A" in the majority of courses taken to fulfill the concentration. You can learn more by visiting the honors page (<https://www.brown.edu/academics/institute-environment-society/education/undergraduate/honors/>) on the IBES website.

The Institute at Brown for Environment and Society administers two concentrations, one an Sc.B. degree in Environmental Sciences and Studies (**requires 17-18 courses**). Students pursuing an Sc.B. degree can further focus their study by selecting one 4 track offerings:

1. Climate and Energy
2. Conservation Science and Natural Systems
3. Environmental Justice and Health
4. Sustainable Development & Governance

**Requirements for the Sc.B. Degree****Core Requirements**

ENVS 0490	Environmental Science in a Changing World	1
ENVS 0110	Humans, Nature, and the Environment: Addressing Environmental Change in the 21st Century	1

**Tools - pick one** 1

Courses focused on building qualitative or quantitative research tools

ANTH 1940	Ethnographic Research Methods
APMA 0160	Introduction to Scientific Computing
APMA 0650	Essential Statistics
APMA 1650	Statistical Inference I
BIOL 0495	Statistical Analysis of Biological Data
CSCI 0111	Computing Foundations: Data
CSCI 0190	Accelerated Introduction to Computer Science
CLPS 0900	Statistical Methods
CLPS 0950	Introduction to programming
DATA 0200	Data Science Fluency
ECON 0110	Principles of Economics
ECON 1620	Introduction to Econometrics
EEPS 0250	Computational Approaches to Modelling and Quantitative Analysis in Natural Sciences: An Introduction
EEPS 1320	Introduction to Geographic Information Systems for Environmental Applications
EEPS 1330	Global Environmental Remote Sensing
EEPS 1340	Machine Learning for the Earth and Environment
ENVS 1911	Narrating the Anthropocene
SOC 1020	Methods of Social Research
SOC 1100	Introductory Statistics for Social Research
SOC 1117	Focus Groups for Market and Social Research

SOC 1340	Principles and Methods of Geographic Information Systems	
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**Electives - three courses 3**

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**Capstone - one or two courses 1-2**

The College expects that a capstone will be completed in semesters 7 or 8 - with the intention of providing an opportunity for students to integrate many aspects of their course of study, or area of focus. This requirement can be met with a two-semester thesis (ENVS 1970 & ENVS 1971), one-semester research project (ENVS 1970 or ENVS 1971), or an approved capstone course.

**Foundations in Earth Sciences and Technology - pick one 1**

Courses focusing on earth, atmospheric, engineering or water sciences.

EEPS 0070	Introduction to Oceanography	
EEPS 0160M	Natural Disasters	
EEPS 0220	Understanding Earth and Environmental Processes	
EEPS 0240	Earth: Evolution of a Habitable Planet	
EEPS 0830	Water in Our World	
EEPS 0850	Weather and Climate	
EEPS 1310	Global Water Cycle	
EEPS 1510	Dynamic Meteorology	
ENGN 0490	Fundamentals of Environmental Engineering	
ENGN 1342	Groundwater Flow and Transport	
ENVS 0070G	Historical Climatology and Global Climate Change	

**Ecology/Biological Sciences - pick one 1**

Courses focused on ecological or conservation biology

BIOL 0210	Diversity of Life	
BIOL 0380	The Ecology and Evolution of Infectious Disease	
BIOL 0420	Principles of Ecology	
BIOL 0430	The Evolution of Plant Diversity	
BIOL 0940D	Rhode Island Flora: Understanding and Documenting Local Plant Diversity	
BIOL 1440	Marine Biology	
BIOL 1470	Conservation Biology	
BIOL 1480	Terrestrial Biogeochemistry and the Functioning of Ecosystems	
BIOL 1515	Conservation in the Genomics Age	
ENVS 1775	Biogeography	

**Environmental Justice and Equity - pick one 1**

Courses focused on environmental issues through a justice and/or equity lens

ANTH 1601	Reimagining Climate Change	
ENVS 0705	Equity and the Environment: Movements, Scholarship, Solutions	
ENVS 1232	Land Stewardship, Sovereignty, and Justice	
ENVS 1247	Clearing the Air: Environmental Studies of Pollution	
ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture	
ENVS 0150	Climate Futures and a Sociology of Just Transitions	

SOC 0250	An Environmental Sociology for a Rapidly Warming World	
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**Environmental Policy and Politics - pick one 1**

Courses focused on the policy, politics and/or governance of environmental issues

ANTH 1601	Reimagining Climate Change	
ENVS 0715	Political Ecology	
ENVS 0717	Ocean Resilience: Ecology, Management, and Politics	
ENVS 1350	Environmental Economics and Policy	
ENVS 1555	Local Food Systems and Urban Agriculture	
ENVS 1574	Climate Policy Research: Organizations and Obstruction	
ENVS 1580	Environmental Stewardship and Resilience in Urban Systems	
ENVS 1615	Climate Change, Human Rights, and the Policy Process	
ENVS 1805	Ocean Governance and Policy	
ENVS 1925	Energy Policy and Politics	
POLS 1015	Politics and Nature	
POLS 1435	Politics of Climate Change	
POLS 1822I	Geopolitics of Oil and Energy	

**Environmental History and Humanities - pick one 1**

Courses focused on the role of history, culture, and the arts in the environment

ARCH 0680	Water, Culture and Power	
ENGL 1160P	Writing Climate, Writing Community	
ENGL 1190U	Nature Writing	
ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture	
ENVS 1557	Birding Communities	
ENVS 1825	Commodity Natures: Supply Chains From Extraction to Waste and Alternatives to Endless Growth	
ENVS 1910	The Anthropocene: The Past and Present of Environmental Change	
ENVS 1916	Animals and Plants in Chinese History	
HIST 0270A	From Fire Wielders to Empire Builders: Human Impact on the Global Environment before 1492	
HIST 0270B	From the Columbian Exchange to Climate Change: Modern Global Environmental History	
HIST 1360	Amazonia from the Prehuman to the Present	
HIST 1820B	Environmental History of East Asia	
HIST 1974D	The Practice of History	
HIST 1976I	Imperialism and Environmental Change	
HIST 1976J	Earth Histories: From Creation to Countdown	
PHUM 1904	Power + Water: Material Culture and its Environmental Impact	
RELS 0260	Religion Gone Wild: Spirituality and the Environment	

**Additional Track specific requirements for the Sc.B. 5**

**Total Credits 17-18**

## Tracks

### TRACK 1 - Climate and Energy

This track is intended for students interested in climate change science, energy systems, and energy/climate change policy

FOUNDATIONS - pick two 2

These courses serve as a foundation to understanding energy, climate systems, and data analysis<sup>1</sup>

APMA 0160	Introduction to Scientific Computing
CSCI 0111	Computing Foundations: Data
CSCI 0190	Accelerated Introduction to Computer Science
CHEM 0330	Equilibrium, Rate, and Structure
EEPS 0240	Earth: Evolution of a Habitable Planet
EEPS 0250	Computational Approaches to Modelling and Quantitative Analysis in Natural Sciences: An Introduction
ENGN 0030	Introduction to Engineering
ENGN 0032	Introduction to Engineering: Design
ENGN 0490	Fundamentals of Environmental Engineering
ENGN 0510	Electricity and Magnetism
ENGN 0810	Fluid Mechanics
PHYS 0030	Basic Physics A
PHYS 0050	Foundations of Mechanics

ENERGY, ENVIRONMENTAL TECH, & INFRASTRUCTURE - pick one 1

ENGN 0490	Fundamentals of Environmental Engineering
ENGN 1930U	Renewable Energy Technologies
ENGN 1931P	Energy and the Environment
ENVS 1400	Sustainable Design in the Built Environment
ENVS 1580	Environmental Stewardship and Resilience in Urban Systems

CLIMATE - pick one 1

EEPS 0830	Water in Our World
EEPS 0850	Weather and Climate
ENGN 1931R	The Chemistry of Environmental Pollution
ENVS 1247	Clearing the Air: Environmental Studies of Pollution

ENERGY & CLIMATE POLICY - pick one 1

ANTH 1601	Reimagining Climate Change
ECON 1340	Economics of Global Warming
ENVS 1574	Climate Policy Research: Organizations and Obstruction
ENVS 1925	Energy Policy and Politics
POLS 1435	Politics of Climate Change
POLS 1822I	Geopolitics of Oil and Energy

**Total Credits** **5**

<sup>1</sup> Students can use a prerequisites for any of the courses selected to fulfill an "Elective" requirement.

### TRACK 2 - Conservation Science and Natural Systems

This track is intended for students interested in ecological and conservation sciences<sup>1</sup>

ECOLOGY 1

BIOL 0420	Principles of Ecology
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CONSERVATION 1

BIOL 1470	Conservation Biology
ORGANISMAL DIVERSITY, ECOLOGY & CONSERVATION TOPICS - pick two <span style="float: right;">2</span>	
BIOL 0410	Invertebrate Zoology
BIOL 0430	The Evolution of Plant Diversity
BIOL 0450	Evolutionary Behavioral Ecology
BIOL 0480	Evolutionary Biology
BIOL 0940D	Rhode Island Flora: Understanding and Documenting Local Plant Diversity
BIOL 1480	Terrestrial Biogeochemistry and the Functioning of Ecosystems
BIOL 1515	Conservation in the Genomics Age
ENVS 1775	Biogeography
POLITICS & HISTORY OF NATURAL SYSTEMS - pick one <span style="float: right;">1</span>	
ENVS 0715	Political Ecology
ENVS 0717	Ocean Resilience: Ecology, Management, and Politics
ENVS 1232	Land Stewardship, Sovereignty, and Justice
ENVS 1555	Local Food Systems and Urban Agriculture
ENVS 1805	Ocean Governance and Policy
ENVS 1916	Animals and Plants in Chinese History
HIST 1974D	The Practice of History
POLS 1015	Politics and Nature
POLS 1435	Politics of Climate Change

**Total Credits** **5**

<sup>1</sup> Most students with an intention of going to grad school in this field will also need: At least one semester of calculus and a statistics course

### TRACK 3 – Environmental Justice and Health

This track is intended for students interested in exploring environmental issues through a justice/equity lens

RACE, CLASS, & GENDER INEQUALITY - pick one 1

Any class focused on race, class, or gender - these courses do not have an environmental theme

AFRI 0090	An Introduction to Africana Studies
AFRI 1920	Health Inequality in Historical Perspective
ANTH 1624	Indians, Colonists, and Africans in New England
ECON 1370	Race and Inequality in the United States
ETHN 1000	Introduction to American/Ethnic Studies
GNSS 0120	Introduction to Gender and Sexuality Studies
HIST 0150D	Refugees: A Twentieth-Century History
SOC 0230	Sex, Gender, and Society
SOC 1270	Race, Class, and Ethnicity in the Modern World

ENVIRONMENTAL JUSTICE & EQUITY - Pick 2 2

These courses focus on environmental issues through a justice and/or equity lens

ANTH 1601	Reimagining Climate Change
ENVS 0150	Climate Futures and a Sociology of Just Transitions
ENVS 0705	Equity and the Environment: Movements, Scholarship, Solutions
ENVS 1232	Land Stewardship, Sovereignty, and Justice
ENVS 1247	Clearing the Air: Environmental Studies of Pollution

ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture	
SOC 0250	An Environmental Sociology for a Rapidly Warming World	
<b>FOUNDATIONS IN HEALTH &amp; INEQUALITY - pick one</b>		<b>1</b>
These courses offer a foundation or an additional tool to study environmental health and inequality		
ANTH 1940	Ethnographic Research Methods	
EEPS 1320	Introduction to Geographic Information Systems for Environmental Applications	
PHP 0310	Health Care in the United States	
PHP 0320	Introduction to Public Health	
PHP 0330	Public Health Policy	
PHP 0400	Intro. to Health Disparities & Making Connection btw Structure, Social Determinants&Health Equity	
PHP 1650	Race, Racism and Health	
PHP 1920	Social Determinants of Health	
SOC 1020	Methods of Social Research	
SOC 1100	Introductory Statistics for Social Research	
SOC 1117	Focus Groups for Market and Social Research	
SOC 1340	Principles and Methods of Geographic Information Systems	
<b>ENVIRONMENTAL HEALTH - pick one</b>		<b>1</b>
These courses focus specifically on public health and the environment		
PHP 0720	Public Health and the Environment	
PHP 1070	Global Burden of Disease	
PHP 1101	World of Food: Personal to Global Perspectives on Nutrition, Agriculture and Policy	
Future course offerings from Professor Rachel Backer and Allan Just		
<b>Total Credits</b>		<b>5</b>

<sup>1</sup> Many AFRI, ETHN, and GNSS classes count with IBES Curriculum Committee approval.

**TRACK 4 - Sustainable Development & Governance**

This track is intended for students interested in the interplay between environmental governance and economics on the global stage, with an emphasis on the non-Western world

<b>GLOBAL GOVERNANCE &amp; DEVELOPMENT - pick one</b>		<b>1</b>
Courses focused on global governance or development (some are non environmental)		
ENVS 0717	Ocean Resilience: Ecology, Management, and Politics	
IAPA 1001	Foundations of Development	
IAPA 1401	Economic Development in Latin America	
IAPA 1404	Economic Development of China and India	
POLS 0200	Introduction to Comparative Politics	
POLS 0400	Introduction to International Politics	
POLS 1435	Politics of Climate Change	
POLS 1440	Security, Governance and Development in Africa	
POLS 1500	The International Law and Politics of Human Rights	
POLS 1822I	Geopolitics of Oil and Energy	
POLS 1826B	Political Economy of Development	

SOC 1490	Power, Knowledge and Justice in Global Social Change	
<b>ENVIRONMENT, JUSTICE, &amp; NON-WESTERN PERSPECTIVES - pick two</b>		<b>2</b>
Any class focused on the Environment and the Global South and/or other non-Western perspectives		
ANTH 1601	Reimagining Climate Change	
ENVS 0705	Equity and the Environment: Movements, Scholarship, Solutions	
ENVS 0150	Climate Futures and a Sociology of Just Transitions	
ENVS 1232	Land Stewardship, Sovereignty, and Justice	
ENVS 1554	Farm Planet: Hunger, Development, and the Future of Food and Agriculture	
ENVS 1580	Environmental Stewardship and Resilience in Urban Systems	
ENVS 1825	Commodity Natures: Supply Chains From Extraction to Waste and Alternatives to Endless Growth	
ETHN 1751A	Indigenous Laws, Environmental Racism, and LandBack	
HIST 1360	Amazonia from the Prehuman to the Present	
PHUM 1904	Power + Water: Material Culture and its Environmental Impact	
<b>ECONOMIC PERSPECTIVES - pick one</b>		<b>1</b>
These courses are intermediate-level economic tools courses		
ECON 1110	Intermediate Microeconomics	
ECON 1340	Economics of Global Warming	
ENVS 1350	Environmental Economics and Policy	
or ECON 1350	Environmental Economics and Policy	
ECON 1355	Environmental Issues in Development Economics	
ECON 1410	Urban Economics	
ECON 1500	Current Global Macroeconomic Challenges	
ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1560	Economic Growth	
<b>FINANCE &amp; ECONOMIC PERSPECTIVES - pick one</b>		<b>1</b>
These courses are either intermediate-level economic tools courses, courses focused on sustainable investing and finance, or the social science of economics systems		
ECON 1110	Intermediate Microeconomics	
ECON 1340	Economics of Global Warming	
ECON 1350	Environmental Economics and Policy	
or ENVS 1350	Environmental Economics and Policy	
ECON 1355	Environmental Issues in Development Economics	
ECON 1410	Urban Economics	
ECON 1500	Current Global Macroeconomic Challenges	
ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1560	Economic Growth	
ENVS 1207	Eco-Entrepreneurship	
ENVS 1545	The Theory and Practice of Sustainable Investing	
ENVS 1547	Finance and the Environment	
HIST 0150A	History of Capitalism	
IAPA 1701Y	Climate Change, Power, & Money	

PHIL 1561	Ethics, Economics, and the Future
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**Total Credits** **5**

## Honors

Students interested in graduating with honors in their concentration must complete a thesis determined to be of the highest quality and must have excelled in their coursework required for the concentration, which is defined here as receiving a grade of "A" in the majority of courses taken to fulfill the concentration. You can learn more by visiting the honors page (<https://www.brown.edu/academics/institute-environment-society/education/undergraduate/honors/>) on the IBES website.