

SUSTAINABLE ENVIRONMENT COMMISSION



Steve McGeehan
Commission Chair

~Agenda~

Kyle Steele
Staff Liaison

sec@ci.moscow.id.us

208.883.7133

<https://www.ci.moscow.id.us/581/Agendas-and-Minutes>

June 16, 2020

6:00 PM

Mayor's Conference Room
City Hall, 206. E Third Street

**PLEASE NOTE THAT THIS WILL BE A ZOOM MEETING
THE MAYOR'S CONFERENCE ROOM WILL BE AVAILABLE TO A LIMITED
NUMBER OF COMMISSION MEMBERS
TO ACCESS THE LIVESTREAM**

ZOOM LINK: <https://uidaho.zoom.us/j/95410278771>

Call to order

1. Approval of minutes from February 18, 2020- Steve McGeehan

(No approval of December 17, 2019 and January 21, 2020 minutes as there was no quorum and they are not official minutes. The SEC did not meet in March and April due to Covid-19).

ACTION: Approve the minutes as presented, modify the minutes, or take other action deemed appropriate.

2. 5G in Moscow – Mike Ray and Wendy McClure

The City of Moscow Planning and Zoning Commission (P&Z) has been working on a draft ordinance to insert 5G regulations into the City's current telecommunications code. The SEC has discussed health concerns related to 5G and whether there might be any recommendations that can be made that don't go against federal law. The city attorney (Mia Bautista) has been working on a legal opinion that will detail the City's limitations to regulate 5G based upon health effects. P&Z and SEC will discuss a unified recommendation regarding 5G that can be advanced to Council.

ACTION: Discuss the proposed draft ordinance and legal opinion and take action as deemed appropriate.

3. Climate Action Working Group – Kristin Haltinner (A)

The Climate Action Working Group has prepared an Impacts Assessment for the City of Moscow. A draft and revised version have been circulated to SEC members via email. CAWG members will present a brief summary of the assessment and answer questions. The SEC will discuss sharing the assessment with Council members as well as outside groups (CCL, ICLEI).

ACTION: Receive the report and vote to share the Impact Assessment outside of the SEC.

4. Announcements/Other Business

Next meeting (July 21, 2020)

Adjourn

NOTICE: Moscow City Council Commission meetings can be televised, videotaped and/or recorded. Individuals attending the meeting who require special assistance to accommodate physical, hearing, or other impairments, please contact the City Clerk, at (208) 883-7015 or TDD 883-7019, as soon as possible so that arrangements may be made.

SUSTAINABLE ENVIRONMENT COMMISSION



Steve McGeehan
Commission Chair

~Meeting Minutes~
February 18, 2020

Kyle Steele
Staff Liaison

sec@ci.moscow.id.us

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The meeting was called to order at 6:02 p.m.

MEMBERS PRESENT: Steve McGeehan-Chair; Fred Pollard-Vice Chair; Victoria Seever; Russ Moore; Tina Hilding; Amber Ziegler; Kristin Haltinner; Ilan Carter

MEMBERS ABSENT: None

STAFF/COUNCIL PRESENT: Kelli Cooper, Environmental Education and Sustainability Specialist; Jenifer Rossini, Administrative Assistant

ALSO IN ATTENDANCE: David Hall; Cassandra Goodmansen; Anne Remaley; David Hall; Roberta Radavich; Eric Perry; Robert Olsen

1. Approval of minutes from November 19, 2019-Steve McGeehan

Result: Approved
Mover: Fred Pollard
Second: Russ Moore

(No approval of December 17, 2019 and January 21, 2020 minutes as there was no quorum and they are not official minutes.)

2. Election of 2020 Chair and Vice-chair – Steve McGeehan

ACTION: Discuss and elect the SEC Chair and Vice-Chair for 2020.

McGeehan gave a brief overview of the process to elect a new Chair and Vice-chair. There was a brief discussion and Hilding nominated McGeehan and Pollard for re-election of their roles and Ziegler second. McGeehan and Pollard accepted and will be continuing their role as Chair and Vice-chair.

3. City Sustainability Report- Kelli Cooper

Kelli Cooper, City of Moscow Environmental Education and Sustainability Specialist, will update the Commission on the City's sustainability activities.

ACTION: Receive the report and provide applicable feedback to staff.

The City Council Stormwater User Fee Study Workshop is being held today. The Environmental Stewardship Award (ESA) has had a soft launch and several trial businesses participate: One World Café and John Kimberling Insurance. Kelli is currently working on

two others for the ESA; Moscow City Hall and has the Moscow School District on schedule for the 21st. Official ESA launch will be in April to coincide with Earth Day. Motel 6 will be switching out 112, 3 gallons per flush toilets. Cooper also provided them with 112 low flow shower heads and low flow aerators for their rooms. Cooper also informed the group that there have been over 700 toilet fixtures replaced and 3.7 million gallons a year saved. Cooper will be helping to run the Pollinator Summit on Feb 26th and 27th. There will be a film at the Kenworthy Theater and a panel discussion on the 26th. The 27th will be the Summit itself. Cooper applied for and got into the climate action training with ICLEI (Internal Council for Local Environmental Initiatives) or Local Governments for Sustainability. Cooper is inviting members of the Climate Action Working Group if they would like to participate in some of the webinars. ICLEI provides greenhouse gases and climate tracking tools, trainings, and a community to communicate with other partners to work on Moscow's sustainability goals. Downtown cleanup will be April 24th from 2:30-4PM and will be meeting at Friendship Square.

4. Moscow High School Subcommittee- Ilan Carter

Report on sustainability activities at Moscow High School including the Environmental Club and Soil Society.

ACTION: Receive the report and take other such action as deemed appropriate.

The Environmental Club would like to have an Environmental Action week the week of Earth Day. They would like to have a voter registration in the commons every morning that week. They will also be doing fundraisers to donate money to the U of I Solar Program. Carter also mentioned having Piper Christian (Environmentalist) come and talk to the Environmental Club and the whole High School for Earth Day. As well as possibly speak at the U of I. Carter would also like to talk with her to possibly get her involved with the downtown clean-up and the climate action plan presentation. David Hall suggested integrating information about 5G into the Environmental Action week.

5. Climate Action Working Group – Kristin Haltinner

The Working Group will provide an update on the group's goals and progress. The group plans discussions with city council members (meet with them individually) to get their input regarding plans for a climate action plan and upcoming public event. Lastly, the group would like to plan a visit with board of Chamber of Commerce in April.

ACTION: Receive the report and take other such action as deemed appropriate.

Hilding started the discussion. Group is still meeting every other Monday. Jeff Hicke is still working on a vulnerability assessment summary. The Group would like the assessment done very soon so they can meet two on two with the City Council as well as hold a public meeting April 22nd 2020 at 5:30 PM. The Group has compiled a list of goals:

- Research the potential impact of climate change on Moscow and Latah County through conducting a vulnerability assessment.

- Research the positive, neutral and negative economic, social and environmental potentials of different actions Moscow could take to mitigate climate change.
- Research the positive, neutral and negative economic, social and environmental potentials of different actions Moscow could take to adapt to a changing climate.
- Gather public input in regards to mitigation and adaptation actions.
- Develop a climate action plan incorporating research and public input.

The complete handout is available by contacting the SEC at sec@ci.moscow.id.us. Ziegler has made talking points when the Group talks with the Council.

- What is the Climate Action Working Group?
- Goals of the Group
- Climate change impacts on Moscow
- Plans for April event
- Receive feedback in regards to what the Group is working on as well as what the Council would like to see the Group work on.

Complete handout available by contacting the SEC at: sec@ci.moscow.id.us. The Group is also planning on meeting with the Chamber of Commerce to gather input and fill the Council in on what they are working on. Hilding stated that at the 22nd public meeting they will present the vulnerability assessment and presentations from the college students, and opportunities for public input. There was a discussion about doing an economic assessment along with the vulnerability assessment. Ziegler stated they would probably have to hire out for that. The following are the commissions that are participating in the subcommittee: Reverend Stephens from UCC Church, Elizabeth Stephens with Human Rights, Judy Mathis from Citizens Climate Lobby, Mary Dupree from Transportation, Robby Copper from Parks and Recreation, Debbie Kadlec from Trees, Planning and Zoning, Al Poplasky from Sierra Club, Jeanine Mathison from Idaho Sustainability, Cassandra Goodmansen and Ilan Carter from the High School. Jonathan Graven with Pathways and Fairer Housing will come when he can. It was recommended to talk to the press before the open house.

6. Fracking Issues in Idaho – Shelley Brock (via Skype)

Shelley Brock of the Citizens Allied for Integrity and Accountability (CAIA) will discuss the status of fracking in Idaho including challenges to the process used by Idaho's Department of Lands to force landowners to lease their mineral rights to oil and gas companies.

ACTION: Receive the report and take other such action as deemed appropriate.

****POSTPONED UNTIL MARCH****

7. Earth Day Awards – Steve McGeehan

The City of Moscow is seeking nominations for the Mayor's 2019 Earth Day Awards. The awards recognize Moscow residents for activities conducive to environmental sustainability.

ACTION: SEC members and guests will prepare nominations for individuals and organizations. The SEC will also organize nominations received from Moscow community members. A final list of nominees will be forwarded to the Mayor for consideration

McGeehan explained that the Sustainable Environmental Commission (SEC) is the clearing house for the Mayor's Earth Day awards. The SEC generally generates the nominations within the commission. McGeehan said nominees should be group, people(s), businesses etc. Nominations need to be sent to Steve with a short summary explaining why they are deserving of the award. March meeting will have list of nominees ready. McGeehan will also send out a list of previous nominees.

8. 5G in Moscow– Steve McGeehan

Continued discussion of the proposed changes to regulating small cell/5G transmission facilities that the Moscow Planning Department is working on.

ACTION: Receive the report and take other such action as deemed appropriate.

Cooper shared handouts from George Bederian. Pollard summarized the last Sustainable Environment Committee (SEC) meeting on 5G as well as the Martin Paul's presentation on 5G. Hilding mentioned a handout from George in regards to an ordinance Mill Valley, California created for the upcoming 5G; she asked what the role of the SEC is in these types of situations. Steve stated that the job of the SEC is to collect facts, listen to the public, and to do their own research; the SEC will then decide if they want to make recommendations to the City Council and he advises all to not take that lightly. The SEC has a small part in the total decision and it may take awhile for an ordinance to come to pass. Steve then asked the visitors their opinions on 5G. Roberta Radavich talked about her concern over not being able to control 5G beaming into her house and how that may disrupt her sleep patterns. There was also discussion about when 5G will be installed in Moscow and neighboring towns. Robert Olsen (PhD, WSU School of Electrical Engineering) asked the group to ask themselves what they think is unique about 5G that they oppose, if they oppose. He also made a statement that 5G will decrease exposure to small cell waves. Switzerland and UK have documents that show evidence of less exposure. Bob referenced the ICNIRP website for more information and publications on 5G. Kristin Haltinner also thought the Group should look at different other aspects of 5G e.g. effects on middle class families, climate change impacts on changing infrastructure frequently etc. There was also talk about how different providers have different frequencies and waves.

To receive a copy of any of the handouts mentioned please email the SEC at sec@ci.moscow.id.us.

9. Commission table at Farmers Market – Steve McGeehan

If the SEC plans to table at the Moscow Farmers Market, we need to submit a registration form before May.

ACTION: Discuss and select date for tabling at the Farmers Market

Amanda Argona, Community Events Manager, needs to know if the SEC is interested in having a commission table at the Farmers Market this season. Argona sent available dates to

McGeehan and he will forward to members. Deadline to respond will be in a week or two. There was a slight discussion in regards to what topics they would like to display at the table.

10. Farmer's Market left over seed packets Steve McGeehan

Would the SEC want to donate the remaining packets to the Pollinator summit?

ACTION: Discuss and take such action as deemed appropriate.

Cooper suggested donating the seeds to the Pollinator event. Haltinner motioned to use the seeds at the Pollinator event. Moore seconded. McGeehan said the SEC can buy more seeds for the Farmer's Market, if needed.

11. Announcements/Other Business

Next meeting (March 24th, 2020)

Renaissance fair needs volunteers for food booth May 2nd and 3rd. The money goes to turtle trip, ecology trip, model UN, and Phillip's farm etc.

Cassandra Goodmansen suggested holding a public event demystifying solar panels and share knowledge about solar panels and other sustainable methods.

U of I approved financing for solar and steam to electricity generators

David has DVD of last Martin Paul presentation he can loan out. Gonzaga University is having Robert Olsen and Martin Paul speak February 22nd.

February 26th Professor Richard Seaman will talk to League of Women Voters about legal aspects of 5G at the 1912 Center.

Dean Parella is suggesting Moscow to become a bee city.

ADJOURN: 8:04 p.m.

Steve McGeehan, Chair (or stamped by Deputy City Clerk)

ORDINANCE NO. 2020 -

AN ORDINANCE OF THE CITY OF MOSCOW, IDAHO, A MUNICIPAL CORPORATION OF THE STATE OF IDAHO; PROVIDING FOR THE AMENDMENT OF MOSCOW CITY CODE TITLE 4, CHAPTER 3; PROVIDING FOR THE ; PROVIDING THAT THE PROVISIONS OF THIS ORDINANCE BE DEEMED SEVERABLE; AND PROVIDING FOR THIS ORDINANCE TO BE IN FULL FORCE AND EFFECT FROM THE DATE OF ITS PASSAGE, APPROVAL AND PUBLICATION ACCORDING TO LAW.

WHEREAS, : and

WHEREAS, : and

WHEREAS, : and

WHEREAS, : and

WHEREAS, : and

NOW, THEREFORE, BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF MOSCOW, IDAHO, AS FOLLOWS:

SECTION 1: That Moscow City Code Title 4, Chapter 3 be amended as follows:

...

H. Telecommunications Facilities.

1. Applicability. This Section shall apply to antenna towers, antenna support structures, antennas and their ancillary facilities (telecommunications facilities) any of which are used to provide commercial telecommunications services. This Section shall not apply to noncommercial antenna towers exclusively used as accessory to a residential use on the same lot.
2. Purpose. The provisions of this Section are intended to ensure that telecommunications facilities are located, installed, maintained and removed in a manner that:
 - a. Minimizes the number of antenna towers throughout the community;
 - b. Encourages the co-location of telecommunications facilities;
 - c. Encourages the use of existing buildings, light or utility poles, water towers or other structures for antenna mounting and discourages construction of new antenna towers;
 - d. Ensures that telecommunications facilities are located and designed to minimize visual impact on the surroundings.
 - e. Ensures that regulation of telecommunications facilities does not have the effect of prohibiting the provision of telecommunications services, does not unreasonably discriminate among functionally equivalent providers of such services, and allows the provision of adequate area coverage by such services.

3. Definitions.

- a. *Ancillary Facilities.* Buildings, cabinets, vaults, enclosures, equipment, and the like required for operation of telecommunications systems.
- b. *Antenna.* Any device that transmits and/or receives radio waves, microwaves, or other electro-magnetic radiation for voice, data or video communications purposes including, but not limited to, television, AM/FM radio, micro-wave, cellular telephone and similar forms of communications.
- c. *Antenna Support Structure.* Any structure or building not constructed primarily for the purpose of supporting an antenna but that supports an antenna as a secondary or accessory use.
- d. *Antenna Tower.* Any structure or pole erected primarily for the purpose of supporting one or more antennas that are used to provide commercial wireless communications or telecommunications services.
- e. *Antenna Tower Height.* The overall vertical length of the antenna tower above ground level.
- f. *Co-location.* Placement of one or more antenna(s) on an antenna support structure or the placement of an antenna on an antenna tower on which one or more antennas are already located.
- g. *Lattice Tower.* An antenna tower characterized by a framework of lateral or diagonal cross members that stabilize the tower.
- h. *Monopole.* An antenna tower that consists of a single upright pole, which is self-supporting and without supports or guys.
- i. *Small Wireless Facility.* Is a telecommunications facility that meets each of the following conditions:
 - i. The structure on which the antenna facilities are mounted is:
 - (a) Fifty (50) feet or less in height; or
 - (b) No more than ten percent (10%) taller than other adjacent structures; or
 - (c) Not extended to a height of more than ten percent (10%) above the height as a result of the collocation of new antenna facilities.
 - ii. Each antenna (excluding associated antenna equipment) is no more than three (3) cubic feet in volume; and
 - iii. All antenna equipment associated with the facility (excluding antennas) are cumulatively no more than twenty-eight (28) cubic feet; and
 - iv. The facility does not require antenna structure registration under Part 17 of FCC regulations; and
 - v. The facility does not result in human exposure to radiofrequency radiation in excess of the application safety standards specified in FCC Rule 1.1307(b).
- h.j. *Telecommunications facilities.* Antenna towers, antenna support structures, antennas and their ancillary facilities that are used to provide commercial wireless communications or telecommunications services.
- i.k. *Temporary Antenna Tower.* An antenna tower established for the purpose of providing tele-communications services on a temporary basis for a special event or to temporarily replace an antenna tower while it is being repaired.

4. General Use Regulations

- a. The installation of lattice towers is prohibited except lattice towers that qualify and are permitted as temporary antenna towers. Replacement, relocation or alteration of

- non-conforming lattice towers shall be subject to the Nonconformity Regulations in Section 4-1-6 of this Zoning Code.
- b. A Conditional Use Permit shall be required before the installation, relocation, replacement, and/or alteration of an antenna tower that exceeds thirty-five feet (35') in height in all Zoning Districts.
 - c. ~~Co-location shall be a permitted use if the property upon which such antenna is located is within one of the following Zoning Districts: U, RO, NB, RTO, CB, GB, MB, or I. An antenna may be co-located as a permitted use on existing antenna towers and antenna support structures in all zoning districts if the antenna extends no more than eighteen feet (18') above, and projects no more than eight feet (8') horizontally away from the existing tower or support structure. Colocation shall also be a permitted use on nonconforming antenna towers if the antenna extends no more than eighteen feet (18') above, and projects no more than eight feet (8') horizontally away from the nonconforming antenna tower. Except for small wireless facilities which are subject to the standards contained in Section 6 herein, co-location shall be a permitted use within all zoning districts when located upon existing antenna towers and antenna support structures if the antenna extends no more than fifteen feet (15') above, and projects no more than eight feet (8') horizontally away from the existing tower or support structure. Any co-location of wireless facilities that exceed such limits shall require a Conditional Use Permit.~~
 - d. A temporary antenna tower as defined herein shall be a permitted use in all zoning districts, subject to site plan approval by the Zoning Administrator. The duration of the temporary antenna tower at the site shall not exceed the special event time or the time reasonably needed to repair the antenna tower in need of repair.
5. General Telecommunication Facility Development Standards
- a. Prohibited Towers. The installation of telecommunications facilities utilizing lattice towers or towers requiring supporting guy wires shall be prohibited.
 - b. Antenna Tower Setback from Highway Right-of-Way. No antenna tower that exceeds sixty feet (60') in height shall be permitted within five hundred feet (500') of US Highway 95 and/or State Highway 8 rights-of-way unless the proposed site is in the U, MB, or I Zoning District, in which case the antenna tower shall be set back a minimum of one hundred feet (100') from said right-of-way.
 - ~~a.c.~~ Antenna Tower Setback from Property Lines. Antenna towers shall be separated from the property line of any adjacent property zoned for residential uses at least a distance equal to the height of the antenna tower, and shall be separated from all other adjacent property lines at least a distance equal to one-half (1/2) the height of the antenna tower.
 - ~~b.d.~~ Security. Every telecommunications facility shall be protected from unauthorized access by appropriate security measures.
 - ~~c.e.~~ Lighting. Every antenna and antenna tower shall not be lighted unless required by the Federal Aviation Administration or other state or federal agency having such authority, and such lighting shall not be more than the minimum required by such agency.
 - ~~d.f.~~ Noise Reduction. In any SR, R-1, R-2, R-3, or R-4 Zoning District, and in all other Zoning Districts when the adjacent property is zoned SR, R-1, R-2, R-3, or R-4 or occupied by a dwelling, hospital, school, library, or nursing home or similar use,

~~noise-generating equipment shall be sound-buffered by means of baffling, barriers, or other suitable means to reduce sound level measured at the property line to forty-five decibels (45 dB). Noise generating equipment shall be sound-buffered by means of baffling, barriers, or other suitable means to reduce sound level measured at the property line to forty-five decibels (45 dB).~~

~~e.g.~~ Signage. The placement of signage on antenna towers is prohibited, except for the placement of security signage, which shall not exceed six (6) square feet on each side of the antenna tower and shall not be located higher than six feet (6') above grade. Additionally, one security sign not to exceed one (1) square foot may be provided on each fifty feet (50') of wall or fence enclosing the facility.

~~f.h.~~ Antenna towers shall be separated from the property line of any adjacent property zoned SR, R-1, R-2, R-3, or R-4 at least a distance equal to the height of the antenna tower, and shall be separated from all other adjacent property lines at least a distance equal to one-half (1/2) the height of the antenna tower.

~~g.i.~~ Aesthetic Considerations.

- i. Antenna towers shall be painted a neutral color consistent with the natural or built environment of the subject site and the surrounding area unless otherwise required by the Federal Aviation Administration or any other State or Federal agency having such authority.
- ii. Equipment shelters or cabinets shall have an exterior finish compatible with the natural or built environment of the subject site and the surrounding area and shall also comply with any design guidelines applicable to the particular zoning district in which the facility is located.
- iii. Antennas and cables shall be of a color identical to or closely compatible with that of the structure to which they are attached unless otherwise required by the Federal Aviation Administration or any applicable state or federal agency. Telecommunications facilities located above ground in or directly adjacent to any ~~SR, R-1, R-2, R-3, and R-4 Zoning Districts~~ residential zoning districts shall be surrounded by a minimum six-foot (6') high decorative wall constructed of brick, stone, or textured concrete block. Said wall shall be surrounded by a Type "A" Landscape Buffer Yard planted adjacent to said wall or fence or at an alternate location providing equal or better buffering. Telecommunications facilities in all other zoning districts shall be surrounded by a minimum six-foot (6') high wall or solid or slatted fence. Said fence or wall shall be surrounded by a Type "A" Landscape Buffer Yard planted adjacent to said wall or fence or at an alternate location providing equal or better buffering.
- iv. Vehicle or outdoor storage on any antenna tower site is prohibited unless otherwise permitted by the Zoning District in which the tower is located.
- v. At least one (1) on-site parking stall with a vehicle turnaround area shall be provided at each antenna tower site. The parking area and driveway to it shall consist of asphalt, concrete, or gravel.
- vi. ~~Ancillary facilities located above ground for antennas in or directly adjacent to any SR, R-1, R-2, R-3, or R-4 Zoning District shall be set back a minimum of twenty-five feet (25') from any SR, R-1, R-2, R-3, or R-4 zoned property, unless the applicant can demonstrate that the specific proposal will present no greater adverse visual and audio impacts to surrounding properties. Above ground~~

~~ancillary facilities in any other Zoning District shall be located a minimum of fifty feet (50') from any SR, R-1, R-2, R-3, or R-4 zoned property, unless the applicant can demonstrate that the specific proposal will present no greater adverse visual and audio impacts to surrounding properties. Ancillary facilities located above ground for antennas shall be set back a minimum of fifty feet (50') from any adjacent property that is either located within a residential zoning district or utilized for residential purposes, unless the applicant can demonstrate that the specific proposal will present no greater adverse visual and audio impacts to surrounding properties.~~

~~h.j.~~ Co-Location Consent for New or Existing Antenna Towers.

- i. Existing Antenna Towers. Prior to the issuance of any permit to relocate, alter or modify any antenna tower, the tower owner shall provide to the City a notarized written commitment to make said antenna tower available for use by others subject to technical and structural limitations and reasonable financial terms. The failure of an antenna tower owner to agree to shared use or to negotiate in good faith with potential users shall be unlawful and, among other remedies of the City, shall be just cause for the withholding of the issuance of future antenna tower permits to such an owner as well as revocation of antenna tower permits for any antenna tower on which co-location is refused or unreasonably hindered.
- ii. New Antenna Towers. Any new or relocated antenna tower eighty feet (80') or greater in height shall be designed and constructed to accommodate at least two (2) additional users unless a larger number of users needs to be accommodated as indicated by the response to the Notice provisions herein. As an alternative, a smaller tower may be approved if the tower owner commits in writing to "swap out" to a larger tower, or extend the tower, when needed to allow co-location space for additional service providers. A notarized written commitment to shared use as specified in Subsection 6.a. above shall be submitted to the Zoning Administrator by the antenna tower applicant. The failure of the owner of an antenna tower built with a capacity for shared use to negotiate in good faith with potential users shall be unlawful and shall be a violation of this Ordinance and, among other remedies of the City, shall be just cause for the withholding of the issuance of future antenna tower permits to such an owner as well as revocation of antenna tower permits for any antenna tower on which co-location is refused or unreasonably hindered.

~~i.k.~~ Antenna Tower Inventories. Prior to the issuance of any permit to install, relocate, replace or alter any antenna tower, the tower owner shall furnish the Zoning Administrator an inventory of all of the owner's antennas and antenna towers in the City of Moscow and ~~the Area of City Impact~~ within one (1) mile of the City limit boundary. The inventory shall include the reference name or number, or other description of location including a site map(s), structure type, height, type of antenna tower(s) or antenna support structure(s) and height of all existing antennas and an assessment of available ground space for the placement of additional equipment shelters for potential future users.

~~j.l.~~ Notice of Antenna Tower Permit Applications. The applicant for any new antenna tower permit shall have a copy of the application and a summary containing the height, design, location, type and frequency of antennas delivered by certified mail to

all known and potential antenna tower users ~~within the service area as identified by a list maintained by the Community Development Department.~~ Proof of such delivery of the summary shall be submitted with the permit application to the City. Such notification shall be so mailed no less than sixty (60) days prior to ~~Zoning Administrator decision or Board of Adjustment the public hearing where the application will be considered~~ and shall specifically solicit co-location discussion between the applicant and recipients of the notice. The Zoning Administrator may establish a form required to be used for such notifications. Upon request, the Zoning Administrator shall place on a list the name and address of any user or prospective user of antenna towers to receive notification of applications. The failure of the party receiving such Notice to use this process or respond to any such Notice may be considered cause for denying requests by such party for antenna tower permits. Such response shall be provided in writing to the Zoning Administrator within forty-five (45) days of mailing and shall contain a statement specifying desire to co-locate on the applicant's proposed tower and a statement regarding the responder's ability to accommodate the needs of the applicant on an existing tower or support structure owned or operated by the responder. ~~Additionally, the Zoning Administrator shall cause notice of any required public hearing for a proposed antenna tower to be mailed to owners of property within six hundred feet (600') of the permit application site not less than sixty (60) days prior to the public hearing.~~

6. Small Wireless Facility Standards.

- a. Applicability. These standards shall apply to the installation of new small wireless facilities antennas or the co-location of small wireless facilities on existing antenna support structures. The City Council may adopt additional small wireless facility design and construction standards by Resolution and the most restrictive provisions of either shall apply.
- b. Approvals. Small wireless facilities shall be subject to the administrative approval of the Zoning Administrator, or their designee, subject to the construction standards and permit and application process and contained herein and as established by Resolution of the City Council.
- c. Co-location upon existing antenna support structures. Co-location of small wireless facilities upon existing antenna support structures shall be a permitted use subject to the following standards.
 - i. Height of co-location antennas. Small wireless facilities shall not extend more than five feet (5') above and two feet (2') horizontally from the existing antenna support structure.
 - ii. Shrouding of antennas and supporting equipment. All small wireless facility antennas, attendant equipment, and cabling shall be shielded from view by equipment and cable shrouds and/or equipment enclosures that shall be colored gray (RAL 7074) or other similar color as approved by the City.
 - iii. Maximum number of shrouds. Only one equipment shroud, containing all required small wireless facility equipment, shall be installed per antenna support structure. Except, one additional equipment shroud shall be allowed per pole if the antenna is located within the second equipment shroud.
 - iv. Shroud mounting method. Small wireless facility shrouds may be either top or side mounted to an existing antenna support structure, or suspended from strand-

mounted to aerial cables as may be approved by the utility cable owner in accordance with the standards contained herein.

(a) Side mounted. Side mounted equipment shrouds shall be located in such a manner as to not obstruct pedestrian access on adjacent sidewalks. Where side mounted equipment shrouds are placed above adjacent sidewalks a minimum clearance of eight feet (8') shall be maintained between the bottom of the shroud and mounting hardware and the walking surface. Where side mounted shrouds overhang the adjacent curb or roadway, a minimum clearance of fourteen feet (14') shall be maintained between the bottom of the equipment shroud or mounting hardware to the roadway surface. If the antenna is mounted to the side of the pole it shall be located inside a maximum shroud of 5.5 cubic feet in volume with a sixteen inch (16") maximum width.

(b) Top mounted. If the antenna shroud is located on top of the antenna support structure, the outer diameter shall be fourteen-inch (14") maximum and the antenna shroud shall be no more than five feet (5') tall, including antenna, radio head, mounting bracket, and all other hardware necessary for a complete installation.

v. Obstruction of lighting prohibited. Shroud installations upon antenna support structures containing street lights shall not obstruct, interfere with, or diminish the light distribution and lighting levels of the street light fixture.

d. Replacement combination light and antenna towers.

i. Existing antenna support structures (such as light poles) may be replaced new equivalent combination structures intended to accommodate the intended function of the existing antenna support structure and accommodate a small wireless facility subject to the following requirements:

(a) The replacement antenna support structure is of the same quality, color, design and style so be consistent with other existing support structures in the surrounding area subject to the approval of the Zoning Administrator;

(b) The replacement antenna support structure is of the same height of the existing support structure excluding the top mounted small wireless facility antenna which may exceed the height of the existing antenna support structure which shall comply with the top mounted shroud standards contained herein;

(c) The replacement antenna support structure shall be designed to internally accommodate all necessary small wireless supporting equipment in accordance with the standards required of new small wireless facilities contained herein;

(d) The replacement of decorative and/or historic light fixtures shall not be permitted unless the applicant can demonstrate that the proposed replacement antenna support structure will not disrupt or interfere with the visual theme and style of lighting within the surrounding area.

e. New small wireless facility antenna towers.

i. Maximum height. No new small wireless antenna tower may exceed forty feet (40') in height unless a Conditional Use Permit is received to exceed this height limitation.

- ii. Antenna and equipment shrouding. New standalone or new and/or replacement combination light and small wireless antenna towers shall fully enclose and contain all the small wireless communications equipment, cabling, and antennas, and shall be of a style and color that is consistent with other similar light poles and fixture within the surrounding area as approved by the City.
- iii. Maximum number of shrouds. Only one equipment shroud, containing all required small wireless facility equipment, shall be installed per antenna tower
- iv. Minimum spacing between small wireless facility antenna towers. Small wireless facility antenna towers shall be located no closer than two hundred and fifty feet (250') from another small wireless facility antenna tower. This separation require shall not apply to co-locations upon existing antenna support structures or replacement combination light and small wireless antenna towers.
Antenna tower design. New small wireless antenna towers shall consist of a ten inch (10") galvanized straight steel pole, powder coated black over zinc paint, with a foundation base of sixteen inches (16") in diameter designed to accommodate all necessary supporting equipment and a top antenna shroud of no more than fourteen inches (14") in diameter. All tower components and antenna shrouds shall be painted a matching black color.

6.7. Permits Required

- a. A building permit shall be required to construct, install, relocate, replace, or alter any antenna tower. An administrative zoning permit shall be required to locate or replace any antenna on an antenna tower or antenna support structure or for the installation of a small wireless facility. A Conditional Use Permit shall be required as specified in Section 4 herein.
- b. An application for any of the above-mentioned permits shall include or be accompanied by all of the information necessary to determine and document compliance with the regulations established herein. Where no application or permit form exists, the application shall be in the form of a letter signed and dated by the applicant, and the permit issuance shall be in the form of a letter of approval signed and dated by the Zoning Administrator or a dated signature by the Zoning Administrator on the applicable site plan.
- c. Specific permit application submittal requirements shall be determined by the Zoning Administrator and may include, but are not limited to, the following:
 - i. Permit application.
 - ii. Site plan.
 - iii. Elevation drawing(s) of the antenna tower or antenna support structure, antenna(s) and ancillary facilities.
 - iv. Photo simulations from three different perspectives of the installation site illustrating the anticipated visual appearance of the proposed wireless facility (not required for small wireless facilities).
 - v. Description of proposed and required lighting including light locations. Documentation of required lighting, as specified in Section 5.c. herein, may be deferred until prior to issuance of building permit if not available at time of application submittal.
 - vi. Any plans necessary to depict structural requirements.
 - vii. Description of the number and types of antennas being proposed, as well as the

expected or known capacity of the antenna tower in terms of the number of antennas the antenna tower can accommodate.

- viii. Antenna tower or antenna location study specifying the search process by which the proposed site was chosen.
- ix. Antenna tower inventory as specified in Section 6.c. herein.
- x. Notarized written commitment to allow co-location/shared use as specified in Section 6 herein (not required for small wireless facilities).
- xi. Documentation demonstrating compliance with non-ionizing electromagnetic radiation (NIER) or radio frequency (RF) emissions standards as established by the Federal Communications Commission (FCC). Such documentation may be deferred until prior to issuance of building permit if not available at time of application submittal.
- xii. Current FCC license to operate.
- xiii. Documentation of a review by the Federal Aviation Administration (FAA) and/or the Aviation Division of the Idaho Transportation Department (ITD). Such documentation may be deferred until prior to issuance of building permit if not available at time of application submittal.
- xiv. Name and address of the property owner, telecommunications service provider, and owner of the telecommunications facility on the permit application, and a written statement of approval of the application by the property owner.
- xv. Description of proposed security measures as required in Section 5.b. herein.

7.8. Findings for Conditional Use Permit.

- a. Before a Conditional Use Permit for an antenna tower may be issued, the applicant must demonstrate, and the Zoning Board of Adjustment must find, compliance with all of the following:
 - i. No existing antenna towers or antenna support structures within the necessary geographic area for the applicant's antenna tower meet the applicant's requirements considering (a) height, (b) structural integrity, or (c) that there are other prohibitive conditions that render existing antenna towers or antenna support structures within the applicant's required geographic area unsuitable.
 - ii. That the design of the antenna tower, including the antennas and ancillary facilities, minimizes visual impact and otherwise complies with provisions and intent of this Section.
 - iii. That the proposed antenna tower location minimizes the number and/or size of antenna towers or antenna support structures that will be required in the area.
 - iv. That the applicant has not previously failed to take advantage of reasonably available shared use opportunities or procedures provided by this Ordinance or otherwise.
 - v. These findings shall be required in addition to those required for the Reasoned Statement of Relevant Criteria and Standards provided in Section 4-8-4 of the Zoning Code.

8.9. Abandonment and Removal.

- a. All telecommunications facilities shall be removed by the owner of the facility, by the operator of the facility, and/or by the property owner within six (6) months of the time that the facility has substantially ceased being used to provide telecommunications services to the public. Removal shall not be required when the

owner or operator of the facility has, within the aforementioned six (6) months, filed with the City a written request to reuse the antenna tower and the City has approved such request. Such written request shall detail the circumstances that justify why the antenna tower should not be removed, why it will be unused for six (6) months or more, and shall commit to a date certain, not to exceed twelve (12) months from the date of last use, by which time the antenna tower will again provide telecommunications services to the public. Before issuance of an antenna tower permit, the applicant for any antenna tower permit shall provide to the City financial security, such as but not limited to an open-ended bond, to ensure removal of the antenna tower and ancillary facilities after the facility is no longer being used to provide telecommunications services to the public.

9.10. Affirmative Duty to Keep City Informed.

- a. All telecommunications service providers having telecommunications facilities in the jurisdiction of the City shall be required to report in writing to the Zoning Administrator any change in the status of their operations. Change in status shall include, but is not limited to, the following:
 - i. Change in or loss of license from the FCC to operate.
 - ii. Receipt of notice of failure to comply with the regulations of any other authority having jurisdiction over the business or facility.
 - iii. Change in ownership of the company that owns the telecommunications facilities or that provides telecommunications services.
 - iv. Loss or termination of lease with the property owner or the owner of the telecommunications facilities.
 - v. Abandonment of a facility or non-use of a facility for a period of six (6) months or longer.
- b. All telecommunications service providers having facilities in the jurisdiction of the City shall file with the Zoning Administrator an annual written statement verifying continued use of each of their facilities in the City's jurisdiction as well as continued compliance with state and federal agency regulations.

...

SECTION 5: SEVERABILITY. Provisions of this Ordinance shall be deemed severable and the invalidity of any provision of this Ordinance shall not affect the validity of remaining provisions. The remaining sections of Title 4 shall be in full force and effect.

SECTION 6: EFFECT ON OTHER ORDINANCES. Where the definitions contained in this Ordinance are in conflict with relevant portions of the City of Moscow, Idaho, Municipal Code, the definitions contained within those portions of the Moscow Municipal Code will be unaffected until such time, if any, as they are amended to be consistent with this Ordinance.

SECTION 7: EFFECTIVE DATE. This Ordinance shall be effective upon its passage, approval, and publication according to law.

PASSED by the City Council and APPROVED by the Mayor this _____ day of _____, 2020.

Bill Lambert, Mayor

ATTEST:

Laurie M. Hopkins, City Clerk

DRAFT

April 1, 2020

Climate Change Impacts Assessment for Moscow, Idaho

“The consequences of a changing climate, including drought, higher temperatures, altered precipitation patterns, increased forest fires, more plant and animal pests and disease, and increased air pollution, have the potential to increasingly impact all Moscow residents.”

*Sustainable Environment
Commission Resolution 2018*

Climate Change Assessment Team

Report Authors

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Dr. Michael Jennings, United States Forest Service, retired
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Tina Hilding, Moscow Sustainable Environment Commission
Russ Moore, Moscow Sustainable Environment Commission
Al Poplawsky, Sierra Club
Elizabeth Stevens, Moscow Human Rights Commission
Amber Ziegler, Moscow Sustainable Environment Commission

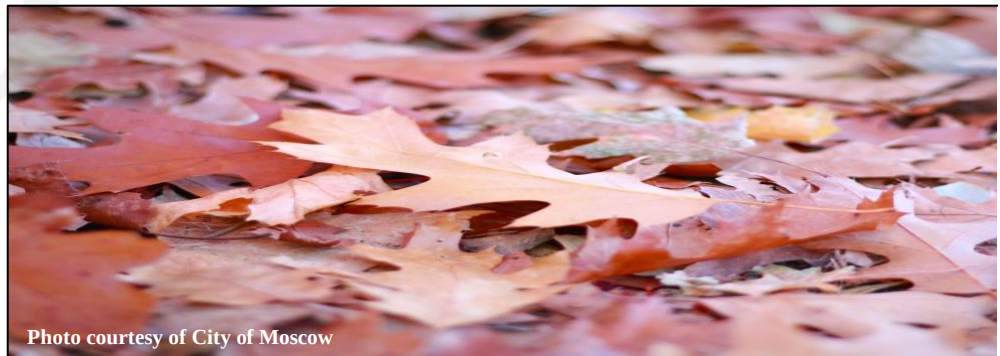


Photo courtesy of City of Moscow

“Eleven Years”

A poem by Young Brown
Clevenger, Age 12, Moscow
Middle School

11 years.

That's what the United Nations
stated in March 2019.

11 YEARS at this rate until
climate change is irreversible.
Our lives wasted in 11 years.

In 11 years, I will be 23. 23!

And that was last year. Last year
was the warning, by this point we
have 10 years.

These ten years will go by in a
snap, and if we don't do anything
about it, we are screwed.

And this is your fault. My fault.
OUR fault.

But these are not going to be our
last moments, our last memories.
WE CAN CHANGE THIS,
together.

Together, we can save the polar
bears, the tigers, the elephants.

Together we can save those in
poverty and sickness. We can
save this Earth, OUR Earth.

Because, without this Earth,
without each other, where would
we be?

Because we need time and time
needs us to heal. To fix the
mistakes we made so we can live
and die, knowing we did right.

We have 10 years to fix what
we've done. Not 10 years to live.
10 year to fix our mistakes.

Executive Summary

Climate change is happening now and is expected to continue into the future. Understanding the magnitude of climate change and how it impacts Moscow and the surrounding landscapes is critical for justifying actions that will reduce greenhouse gas emissions (“mitigation”) and minimize any negative effects (“adaptation”). This Climate Change Impacts Assessment of the Palouse Region reports on a) the extent that the climate has changed over the past several decades, b) the changes expected in the future, and c) the effects climate change has had and will have on the people and ecosystems of the Palouse Region.

Air temperatures have increased in Moscow over the last 100 years, and depending on future societal choices about greenhouse gas emissions, it is projected to continue increasing for decades to come. Warming will occur in all seasons, and heatwaves are expected to increase in severity and frequency. Precipitation has increased slightly since 1950; projections indicate that future annual precipitation will increase, but that summer precipitation will decrease. As a result of warming, precipitation will shift toward more rain and less snow, and snowpack will decline and melt earlier. The reduced snow season will mean longer, drier summers, with resulting increases in fire season length and more fires and reduced summer streamflow that will affect aquatic ecosystems and water quantity and quality for human uses. Human health will be affected through additional smoke from more wildfires, increased heat-related morbidity and mortality, more pollen and ozone pollution, and expansion of vectors of disease. Agriculture will be affected both positively (through carbon dioxide fertilization and longer growing seasons) and negatively (through reduced summer soil moisture and increased pest outbreaks). Some forests at higher elevations in northern Idaho could benefit from longer growing seasons, and lower-elevation forests may decline because of additional moisture stress.

The impacts described in this assessment will provide input to the next step, a Climate Change Vulnerability Assessment, that will be undertaken to identify specific areas and sectors of the Moscow region that will be susceptible to climate change.

Data Used in this Report

Historical Data

Statements about historical (the last 100-150 years) climate change are best made with the longest, most reliable observations possible. In the United States, those are from the Historical Climatology Network (HCN), a set of high-quality stations with long-term records and minimal gaps. Temperature and precipitation (rain plus snow) have been recorded since about 1900 (varies by station). Although the HCN stations are somewhat sparsely distributed geographically, the HCN station nearest to Moscow is located at the University of Idaho.

Projection Data

Climate projections are produced by running a climate model with a prescribed “scenario” of greenhouse gas emissions (see box at right). Climate model outputs are analyzed for different periods in the future, typically near-term (next decade), mid-century, and end-of-century. Because of variability in climate model complexity, projections from multiple models are often presented, with the average among models often assumed to be most representative.

Impact Data

The information in this report is drawn from the peer-reviewed scientific literature and summaries, syntheses, and reviews of climate change in local, national, and international assessment reports (see end of document). Idaho examples are provided where available; some findings may be based on regional (US Northwest) studies of impacts; in cases where local or regional studies are not available, information is based on the best scientific understanding of climate influences.

How climate models work

A variety of inputs to climate models is included when making projections about future climate change. The most difficult input to determine is any change in human behavior that may affect the emissions of greenhouse gases. Therefore, scientists have developed different scenarios for use that are not predictions but rather possible future pathways. These scenarios span the range from low emissions in the future that minimize future climate change (such as “RCP4.5”) to moderate emissions scenarios to high emissions scenarios (such as “RCP8.5”) that project continued emissions growth and a higher amount of climate change. Different emissions scenarios (e.g., low versus high) associated with different possible societal choices, population growth, and socioeconomics result in different amounts of climate change and illustrate the effects of reducing emissions. Recent greenhouse gas emissions have been most similar to the RCP8.5 scenario.

For more information see:

“Climate Models” by NOAA

<https://www.climate.gov/maps-data/primer/climate-models>

“Evaluation of Climate Models” by IPCC

https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter09_FINAL.pdf



University of Idaho Arboretum by Kristin Haltinner, 2014

Climate Change Impacts in the Palouse Region

Temperature Changes

Recent climate change has been caused in large part by increasing greenhouse gases in the earth's atmosphere, which trap more heat than would otherwise escape to space, causing the earth to warm¹. The amount of climate change is not the same across the earth due to variability in land features and air and water circulation patterns¹. This section looks at the historical and projected temperature changes for Moscow, Idaho, and the region.

Climate station records indicate that temperatures in our region have already increased. From 1900 to 2018, the average annual temperature increased by 1-1.5 °F². Due to the impacts of other environmental factors—such as snowpack and water—the increase in average temperature is not evenly distributed over the year. Rather, the increase in warming has been slightly greater in the winter than in the summer: the coldest temperature of the year has increased by 2-5 °F³ while the warmest temperature of the year did not change significantly.

Climate model projections using higher emissions scenarios (RCP8.5) suggest that Moscow will continue warming by another 6-12 °F through 2070-2099^{4,5} (Figures 2 and 3). In the Northwest region, warming of 3.7 °F (lower emissions scenario, RCP4.5) to 4.7 °F (higher emissions scenario, RCP8.5) is projected by mid-century, with warming of 5-8.5 °F by late century³.

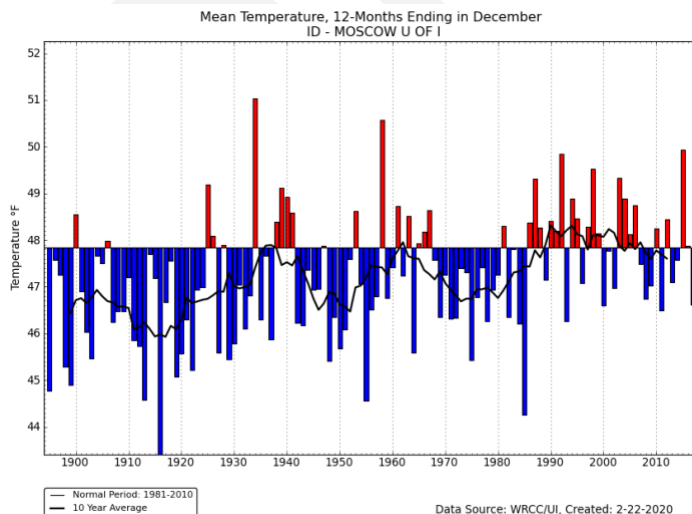


Figure 1. Observed average annual temperature for Moscow, ID, recorded by the Moscow HCN climate station. Blue bars are below the average temperature, red bars are above.

Since 1900 annual average temperatures have increased 1-1.5 °F. They are expected to increase another 6-12 °F by 2099.

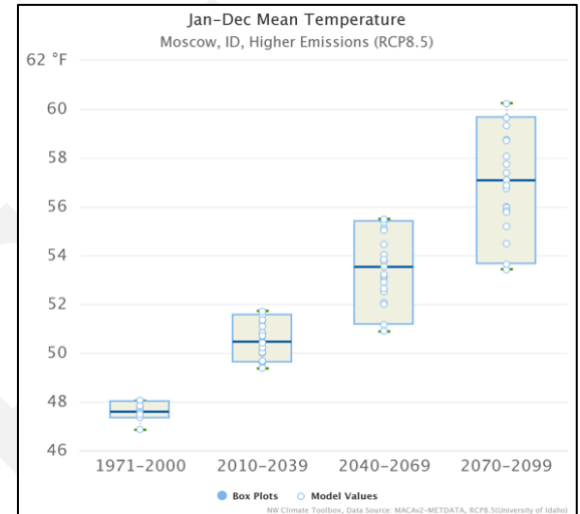


Figure 2. Projected average annual temperature for Moscow, ID, using the higher emissions scenario (RCP8.5). For each time period, dots indicate different climate model results, the black line indicates the median temperature, and the green box indicates the 25-75 percentile range of models.

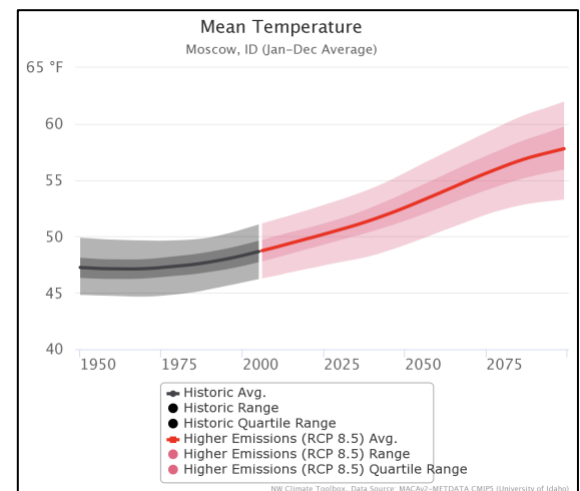


Figure 3. Projected average annual temperature for Moscow, ID, using the higher emissions scenario (RCP8.5). Black lines indicate model results for historical period, red lines indicate model projections into the future; bands indicate range of results from different climate models.

Summer Temperatures

Summer temperatures in Moscow are projected to increase significantly. Currently summer high temperatures average around 80 °F (Figure 4)⁴. Considering all climate model results, summer temperatures are projected to increase to 92 °F by the last decades of the century. Regional trends are similar: the warmest day is projected to increase by 6 °F by mid-century. Heat waves will also become more intense: the temperature of the most extreme (1-in-10 year) heat waves (5-day warm conditions) is expected to increase by 12 °F⁴. The number of days with a heat index (a measure of “apparent temperature” that combines temperature and relative humidity) above 90 °F is projected to increase from fewer than 10 today to more than 50 by 2070-2099 (Figure 4). Extremely hot days (temperatures above 100 °F or 105 °F) are also expected to increase. These conditions are rare today but are projected to occur frequently by the end of this century (Figure 4)⁴.

Summer maximum temperatures are expected to increase by 12 °F.

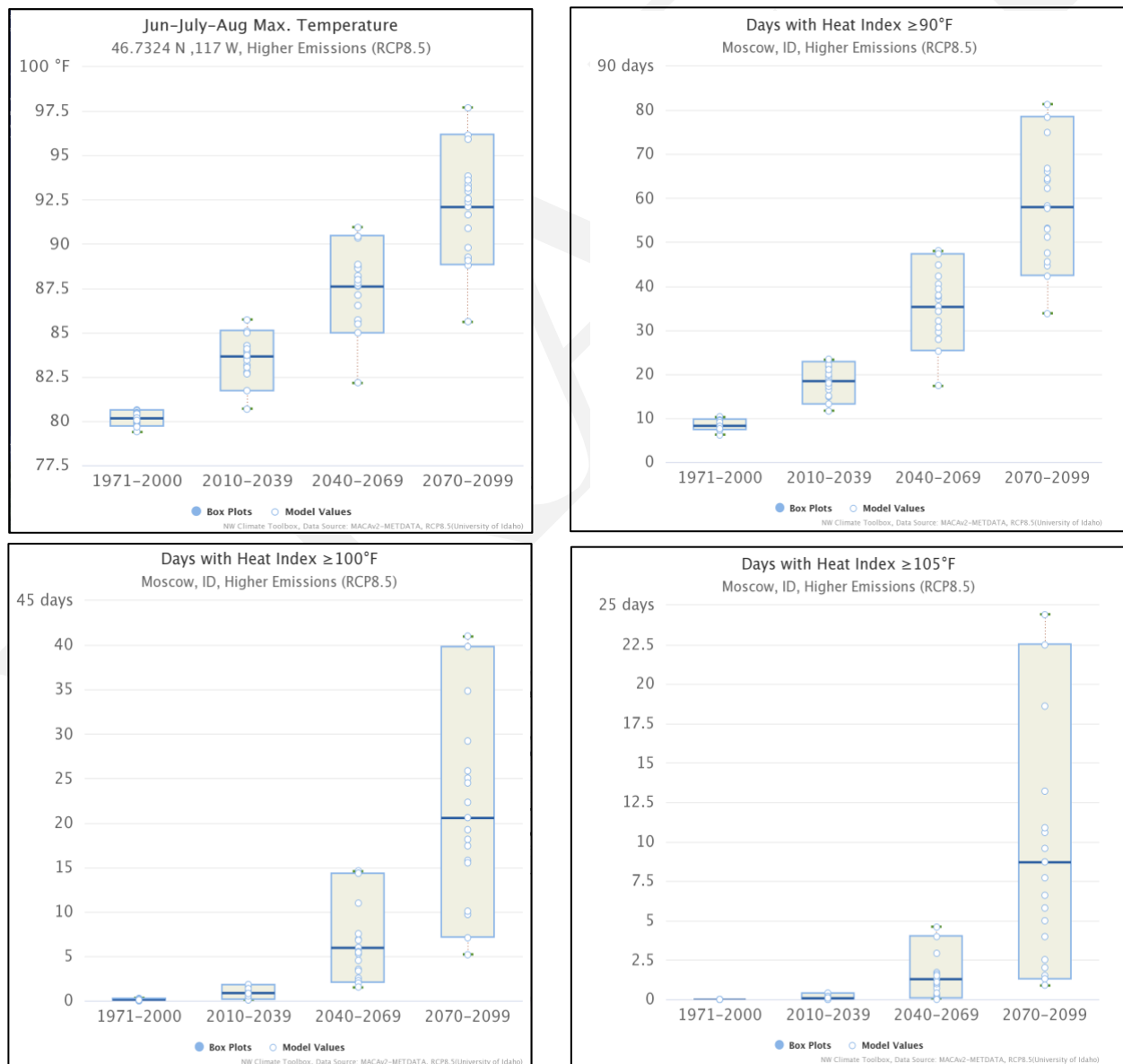


Figure 4. Projected summer temperatures (upper left) and heat indices (upper right, lower left, lower right) for Moscow, ID, using the higher emissions scenario (RCP8.5). See Figure 2 for more details about box plots.

Winter Temperatures

Winter temperatures in Moscow are also projected to increase. Average winter (December-January-February) temperature is projected to increase from below freezing to 41 °F by late century (Figure 5)⁴. This change is particularly significant as it will influence whether precipitation falls as snow or rain and will impact the amount and duration of snow cover. The number of days with minimum temperature above freezing will increase from a current average of 240 to 330 by the end of the century (Figure 6). The temperature of the coldest day of the year for the Northwest is projected to increase by 7 °F by mid-century, and the temperature of extreme cold snaps (5-day temperatures for 1-in-10 year events) is expected to increase by 11 °F³.

Winter temperatures are expected to rise from below freezing to 41 °F. The annual number of days above freezing will increase from 240 to 330 by 2100.

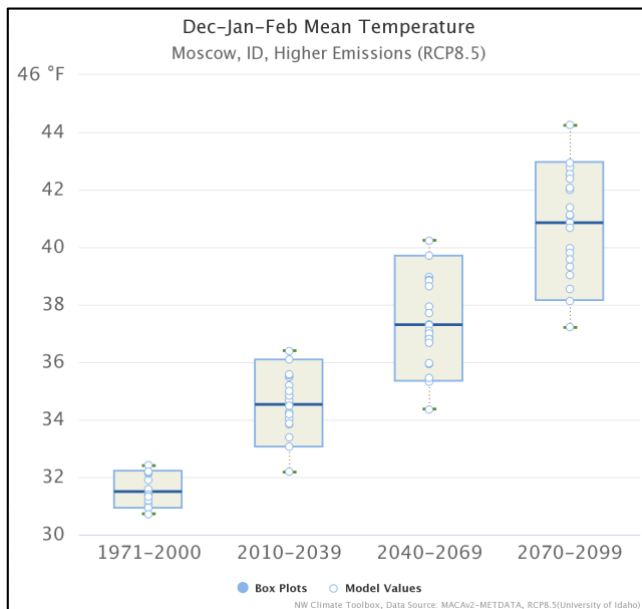


Figure 5. Projected winter (December-January-February) temperature for Moscow, ID, using the higher emissions scenario (RCP8.5). See Figure 2 for more details about box plots.

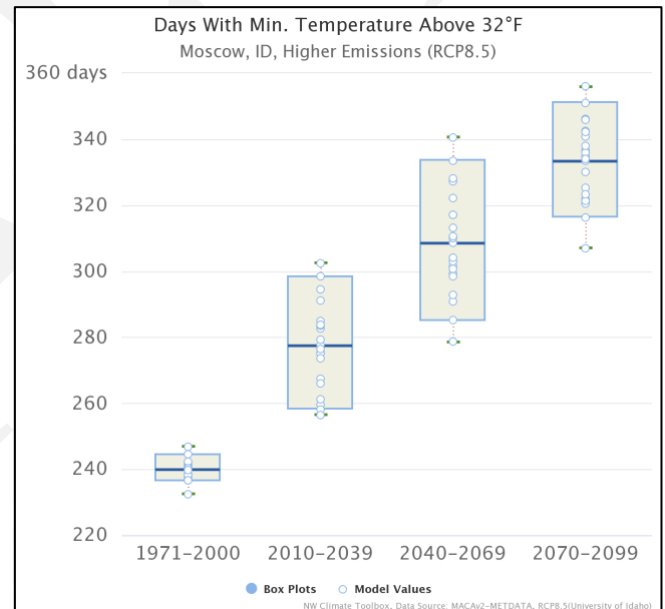


Figure 6. Projected number of days with minimum temperature above freezing (32 °F) for Moscow, ID, using the higher emissions scenario (RCP8.5). See Figure 2 for more details about box plots.



Precipitation Changes and Water Impacts

In addition to changes in temperature, climate change will also alter precipitation patterns¹.

Northern Idaho has experienced slightly higher annual precipitation in the last 100 years, with decreases in fall and winter precipitation and increases in spring and summer precipitation (Figure 7). Since 1900, total annual precipitation has increased slightly, with most of the increase occurring in the last 50 years (Figure 8)². Between 1900 and 2018, summer precipitation—important for plant growth—has varied greatly and demonstrated little long-term trend (Figure 9). In the Northwest region, extreme precipitation events have increased somewhat in frequency in the 20th century, although the total amount of extreme precipitation has not varied significantly³.

The intensity of precipitation is projected to increase throughout the region.

Climate models project that annual precipitation for Moscow will increase overall. Model results from both high and low emissions scenarios project an increase from 27” of annual precipitation in recent years to between 28 and 29” by late century (Figure 10)⁴. The largest increases are expected to occur in winter and spring, and summer precipitation is projected to decrease by 0.5” (14%), from 3.7” to 3.2” (Figure 11).

The intensity of precipitation is projected to increase across the Northwest region. The amount of precipitation during extreme events is expected to increase by 9-19%, depending on time period and emissions scenario. Model results using the highest emissions scenario project an increase in the frequency of extreme precipitation events by a factor of 2-3³. Extreme precipitation events can lead to flooding and soil erosion⁶.

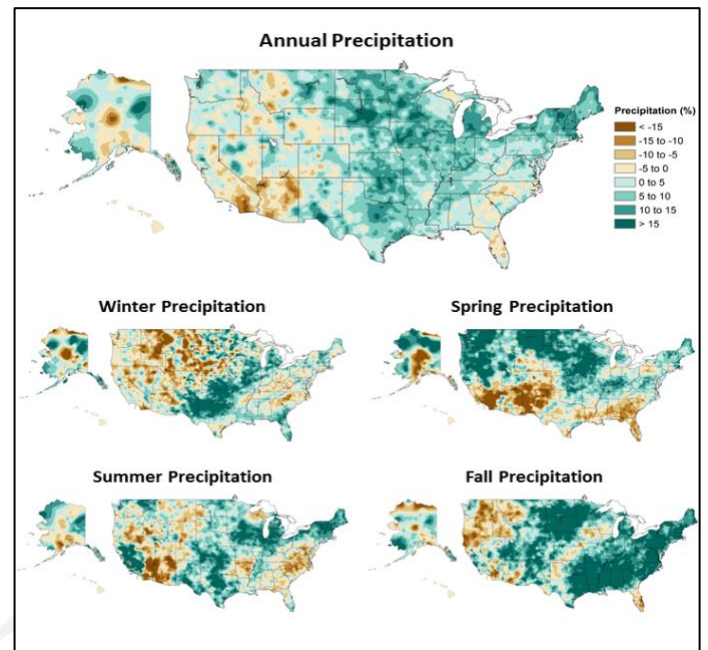


Figure 7. Annual and seasonal changes (1986-2015 average minus 1901-1960 average divided by 1901-1960 average) in precipitation. From USGCRP, 2017.

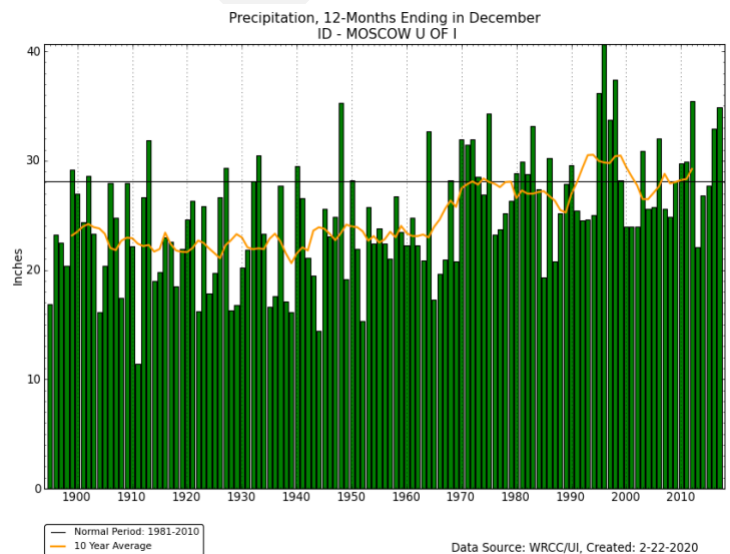


Figure 8. Observed annual precipitation for Moscow, ID, recorded by the HCN climate station. Horizontal black line indicates average during 1981-2010; orange line indicates running 10-year average.

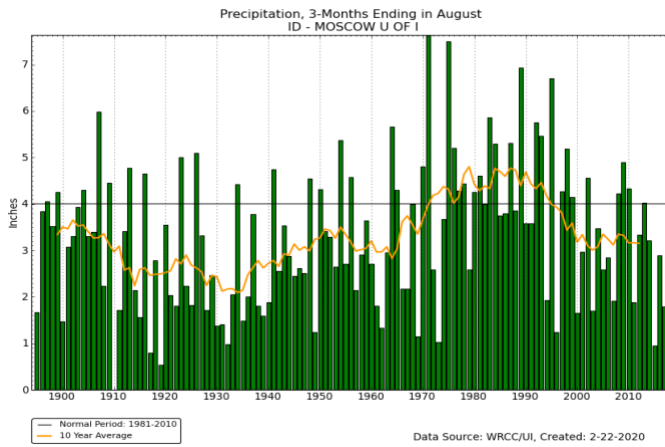


Figure 9. Observed summer (June-July-August) precipitation for Moscow, ID, recorded by the HCN climate station. Horizontal black line indicates average during 1981-2010; orange line indicates running 10-year average.

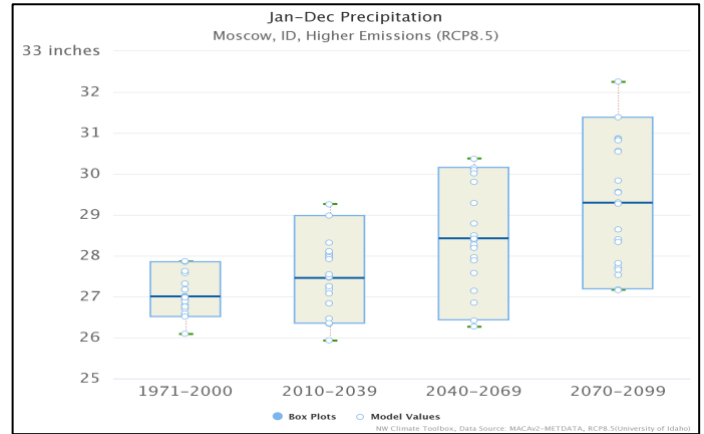


Figure 10. Projected annual precipitation for Moscow, ID, using the higher emissions scenario (RCP8.5). See Figure 2 for more details about box plots.

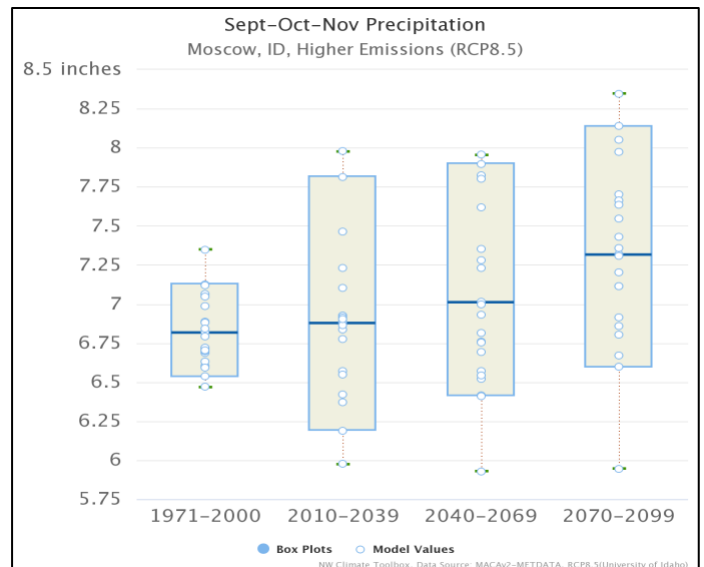
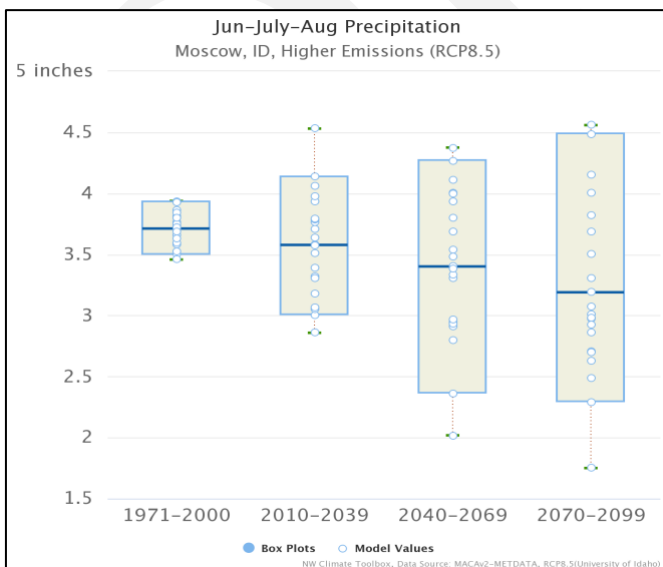
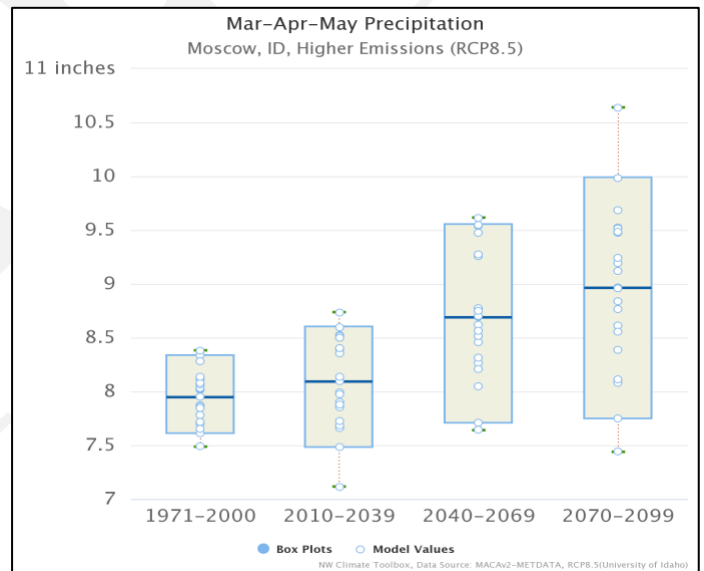
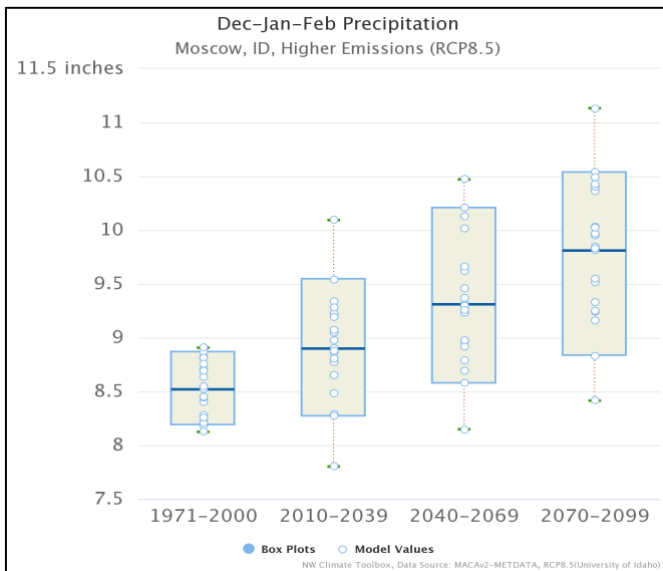


Figure 11. Projected precipitation for winter, spring, summer, and fall for Moscow, ID, using the higher emissions scenario (RCP8.5). See Figure 2 for more details about box plots.

Local Experiences with 2019 Flooding

by Al Poplawsky

I have lived in Moscow since 1988 and during that period have observed major flooding several times, with the worst occurring in 1996 - until last year.

These previous floods were classic “rain on snow” events which occurred when a “pineapple express” (warm rainstorm) came roaring into the region in the late winter with lots of snow on the ground. These events are very predictable and are generally forecast by the National Weather Service (NWS) several days in advance.

From 1988 until 2019 I had never heard of a flash flood in our region and I thought of these more in terms of the Southwest of our country. However, in 2019, we experienced the effects of two flash floods locally. The first, in April 2019, occurred with no snow on the ground.

I walked at mid-afternoon in the driving rain from the UI Ag Science building a few blocks to the Sixth Street Greenhouse and noticed torrents of water running in the street gutters into the storm sewers. I was a bit confused. I am a weather nut and had just checked the NWS website which predicted showers but nothing major, and there were no warnings up.

After spending an hour at the greenhouse, I came out the door to return to the Ag Science building and was amazed by what I found. The pavement on Sixth Street and Stadium Way from the intersection to 20-30 yards in all directions was completely underwater! The storm sewers had been overwhelmed in a very short period of time. The NWS now had flood warnings up on their website.

When I rode my bike home an hour later water was up to the axles at the intersection of Sixth and Washington in downtown Moscow. There was also major flooding in north Moscow near North Main and D Streets, and east of Mountain View on D Street. In the latter location, several residents suffered major losses because they had no warning and thus no time to move their belongings to higher ground. In Pullman, Grand Avenue turned into Grand River.

There was a second, smaller flash flood just east of Moscow less than a month later, which deposited large quantities of mud on the Latah Trail. Neither of these floods had been predicted by the NWS because they were caused by unpredictable, intense rain events. These were the first such events I had ever experienced during 30 years in Moscow.

Flooding in Moscow by Randy Stuart, 2019



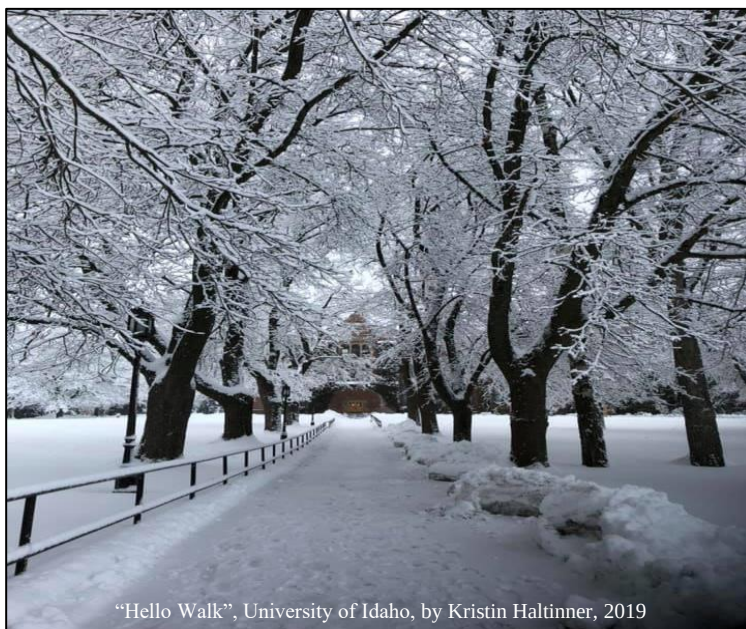
After the Storm by David Harlan, 2020

Snowpack

During the latter part of the 20th century, warming caused declines in snowpack and earlier snowpack melt across the western United States⁷. Moscow, Idaho shows similar trends: snow water equivalent (a measure of snowpack) at Idaho sites near Moscow decreased by 40-80% between 1955 and 2016⁷.

In recent decades, as melting has occurred earlier, Idaho streamflow peaks associated with snowmelt have also come earlier. The volume of water has also been reduced^{8,9}. Historically, the watersheds that are influenced by snowpack experience peak streamflow volume in June. During the 60 years between 1948 and 2008, the annual percentage of streamflow that occurs in June has decreased in northern Idaho watersheds by 1-15%⁸. This shift indicates that snowmelt is occurring earlier, that the amount of snowmelt is reduced and, as a result, there is less streamflow during summer. Projections also indicate reduced future winter (December-February) snowpack in Idaho, particularly at lower elevations, with more reductions associated with greater warming in later years³. As a result, summer streamflows near Moscow are projected to decrease by 20-40% by the 2040s under a moderate greenhouse gas emissions scenario⁸.

Reduced snowpack can have consequences for fire season, agriculture, and winter recreation. For example, the length of the ski season in northern Idaho is projected to decrease by 50% or more by 2050¹⁰.

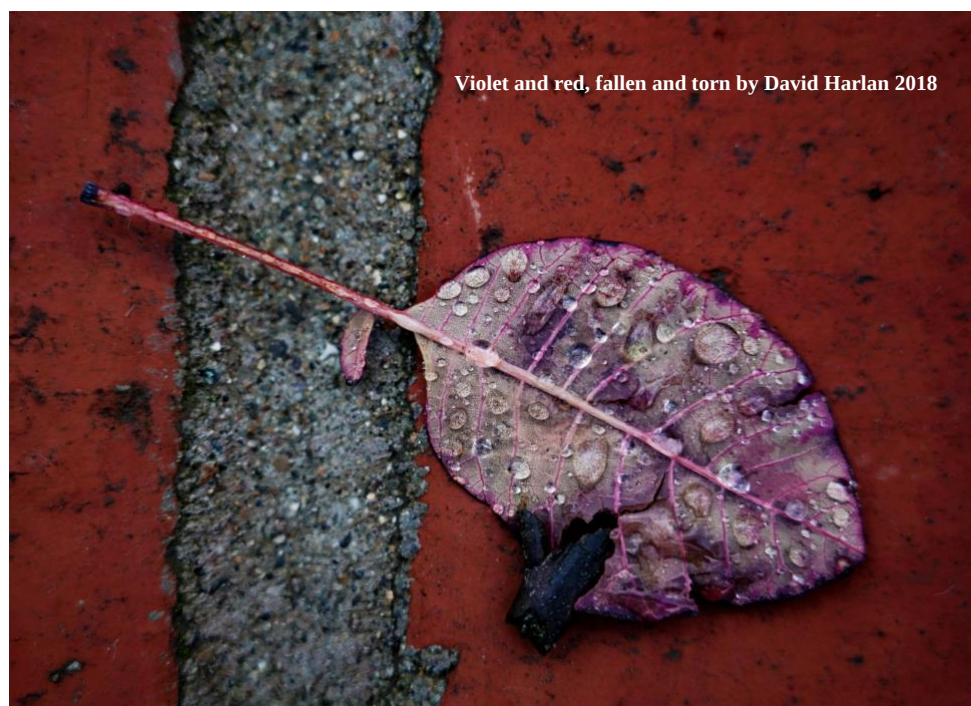


Streamflows in northern Idaho have decreased since the mid-1900s, and summer streamflows are expected to decrease 20-40% by the 2040s.



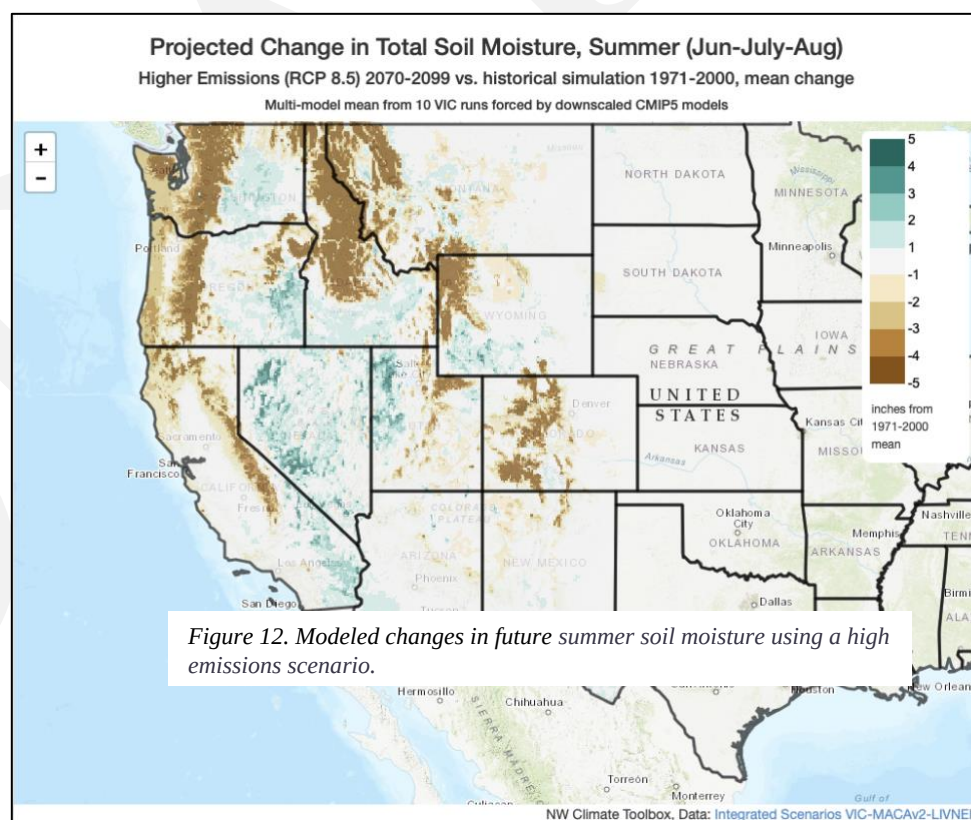
Soil Moisture

Despite projections of increased precipitation in the winter, spring, and fall, summer soil moisture is expected to decrease³ and annual water deficit (an indicator of plant stress) is expected to increase (Figure 12)¹¹ as a result of decreased summer precipitation and increased evaporation rates associated with higher projected temperatures. These increasingly drier conditions will have impacts on agriculture and fire seasons.



Water Quantity and Quality

As described above, observations and projections indicate reductions in snowpack amount, timing of spring runoff, and streamflow throughout the year. These alterations indicate the likelihood of significant impacts to fisheries and aquatic ecosystems, dam operations, hydropower, and farm irrigation. In addition, lower summer water flows and higher air temperatures will increase summer water temperature, and higher air temperatures will increase water temperature in lakes and streams. The last 50 years have brought a 1.5 °F



increase in water temperature for the North Fork of the Clearwater River⁹. Higher water temperature affects freshwater ecosystems, including fish, and increases the potential for harmful algae blooms¹².

Wildfires

Over the past 30 years the western US has experienced a warming and drying climate that has led to a greater prevalence of dry fuel for forest fires and subsequent increase in area burned¹³. In the past 25 years, Idaho fire seasons have lengthened by 47 days⁹.

The number of large fires has also increased in recent years. Across the Rocky Mountains, the number of large fires between 1984 and 2011 rose from less than 20 fires per year in the 1980s to more than 40 per year in the 2000s³. However, there was substantial variability from year to year.

The annual area burned is expected to increase by a factor of 10 by 2050.

Future projections indicate that forest fires will continue to increase throughout Idaho, including near Moscow. The annual area burned is expected to increase by a factor of 10 by 2050 (using a moderate greenhouse gas emissions scenario) with additional increases by 2100¹⁴. For Moscow, the number of extreme fire danger days is projected to double by 2050 from 11 to 22 (under the high emissions scenario; Figure 13)⁴. Increasing fire frequency and size will have significant negative impacts on the community. We will face additional losses related to infrastructure (structural damage), injury and deaths due to fire, the effects of reduced air quality from smoke on human health, economic costs of fire suppression, recreational land closures because of higher fire risk, and soil degradation and siltation of streams after burns.

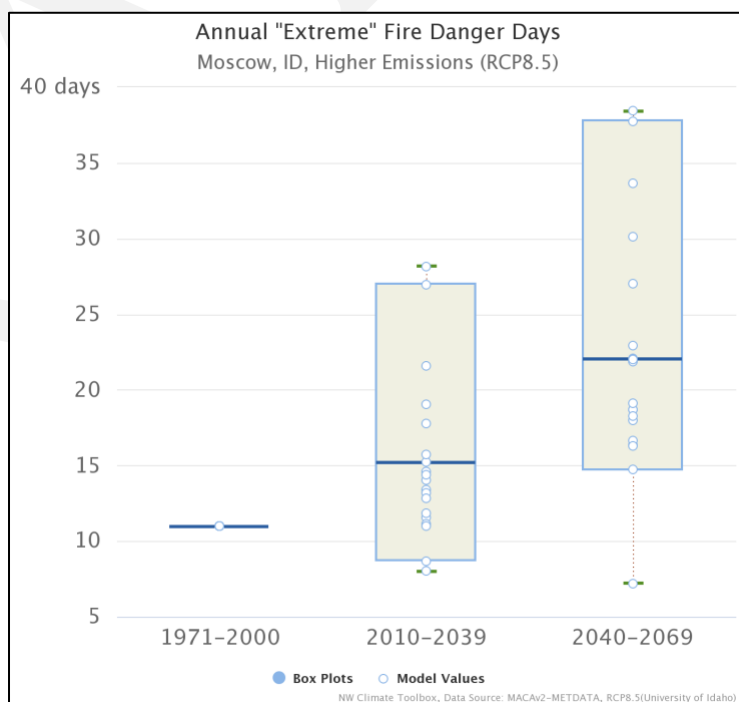


Figure 13. Modeled changes in future number of days with extreme fire danger using a high emissions scenario. See Figure 2 for more details about box plots.

Public Health

Climate change is expected to have profound impacts on public health.

First, the increase in wildfire activity is expected to cause a decrease in air quality. Decreased air quality is correlated with a rise in respiratory and cardiovascular illnesses¹⁵. Respiratory problems are also likely to increase as a result of increased ozone and pollen⁸. People with asthma or weakened immune systems, the very young, the very old, and those who lack health care are at greater risk of negative effects of poor air quality and therefore these impacts of climate change¹⁵.

Second, the rising temperatures in the summer and increase in heat waves are likely to cause a rise in hyperthermia (overheating) and heat-related deaths throughout the region⁸. High air temperature is also correlated with cardiovascular illnesses, respiratory illnesses, kidney function, mental health, and premature childbirth¹⁶. These problems are exacerbated in the very young and the very old.

Projected warming is expected to lead to a reduction in cold-related mortality in Idaho that may outweigh the increase in heat-related deaths, possibly resulting in a reduction in overall climate-related human mortality¹⁷. However, this conclusion is subject to some uncertainty because of confounding factors such as humidity and air quality as well as inconsistent and underreported experiences with both hyperthermia and hypothermia¹⁶.

Third, the rising water temperatures resulting from increased temperature and earlier snowmelt are expected to lead to an increase in water-borne illnesses. Two such illnesses of local concern are caused by *Cryptosporidium* and *Giardia*¹⁸. Surface water for human consumption is at risk for contamination as a result of pathogens or toxic algae blooms¹⁸.

Fourth, vector-borne illnesses are expected to spread across the region as conditions warm, affecting the range and seasonal activity of insects, such as ticks, and other vectors¹⁹. The number of days that it is warm enough for disease carrying mosquitoes to survive, termed “disease danger days,” increased from 113 to 126 in the Lewiston area between 1970 and 2017²⁰. West Nile virus occurs in Idaho²¹, and projections indicate an increased probability of the virus occurring as temperatures increase²². Studies of the responses of such diseases to increasing temperatures are unavailable for Moscow.



Local child at Moscow's Rural Fire Station by Kristin Haltinner, 2017

Agriculture and Food

Multiple impacts of climate change to agriculture could occur; however, detailed scientific understanding is currently incomplete. Generally, the impact on wheat farming is expected to be positive, with an increase in wheat yields projected as a result of CO₂ fertilization and warmer temperatures^{17,23,24}. Yield increases are expected to plateau or yields to decline by the end of the century, depending on scenario and location²⁴. For other crops, the impact of warmer temperatures and decreased soil water is likely to decrease growth²⁵. Climate change will also lead to a change in the best locations for crops to grow. For example, higher temperatures may lead to an expanded area of conditions suitable for growing perennial crops such as almonds²⁶. Carbon dioxide fertilization may lead to lower nutritional value for some crops important for human food²⁷.

Insects, pathogens, and weed pests may increase in response to climate change, thereby offsetting some projected yield increases²⁴.

Climate change is also projected to impact livestock. Domestic animal foraging may increase because of a longer grazing season and shorter period of winter feeding of animals^{28,29}. However, hotter summers are expected to lead to greater heat stress of livestock, which reduces productivity³⁰.

Higher temperatures and precipitation changes will also impact local fish populations and fisheries. As temperatures rise, fish become stressed, leading to fish die-offs or poor migratory returns, which may impact recreational fishing and related tourism in the region.

Experience of Local Farmers by Ian Clark

As dryland farmers, we gamble on future favorable weather every time we put a crop in the ground.

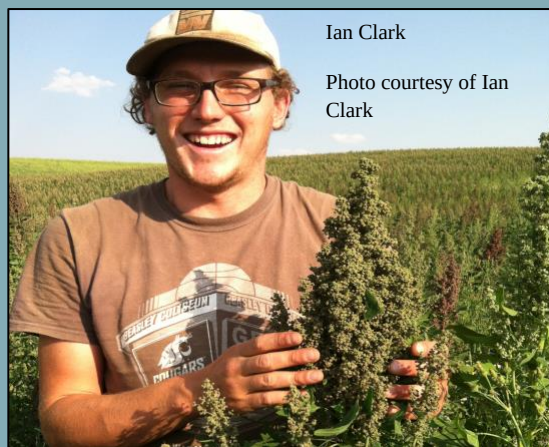
Here in the Palouse, we have been very fortunate to live in a relatively stable climate which has been excellent for producing grains, legumes and other crops. Climate change threatens this stability and the crops that depend on it.

An increase in unstable and volatile weather (which is predicted for this area) has the potential to devastate the current farm economy as we know it. Extreme weather events such as drought, flooding, temperature swings, heat, or hail can ruin a crop overnight.

Winter wheat, the backbone of dryland PNW ag, takes over 10 months from seeding to harvest. This means that for over 80% of the year our wheat is susceptible to extreme weather.

Adaptation and resilience is a necessity as things are always changing but climate change has the potential to strain local farmers past what they are capable of.

The existence of a changing climate is not what we should be asking in agriculture, it is are we ready, willing, and able to adapt quick enough to continue to make a living farming on the Palouse.



Ian Clark

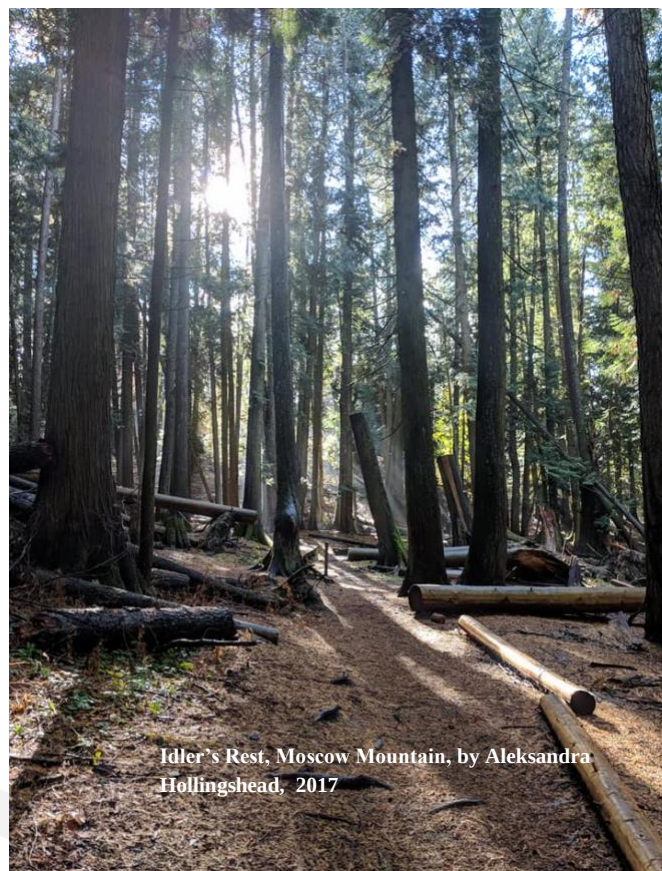
Photo courtesy of Ian Clark

Forestry

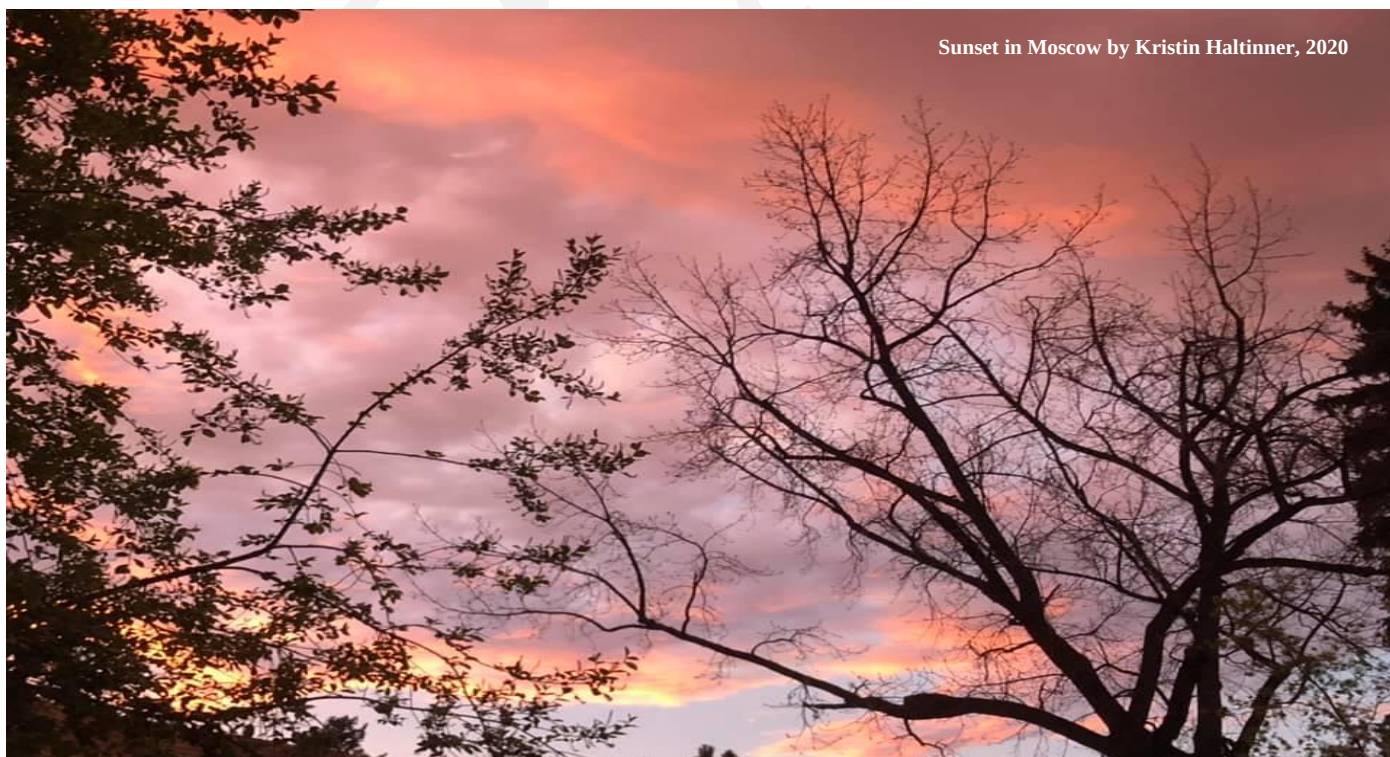
Idaho has 20.5 million acres of federally designated forest land, covering about 40% of the state³¹. Climate change is expected to impact forests in our region. Tree species that have adapted to lower-elevation and moisture-limited landscapes, such as Douglas-fir or ponderosa pine, will be stressed more by warming³². Higher-elevation spruce and larch may be eliminated from many landscapes as conditions become too warm or dry³³. Forests are also threatened by an increasing likelihood of forest fires.

Forests are also expected to be impacted by an increase in insects and pathogens. Tree mortality from bark beetles has already resulted in a loss of 1.5 million acres of trees in the last several decades³⁴. Bark beetles thrive in warmer, drier climates as do some forest pathogens³⁵⁻³⁸, and as a result, bark beetle outbreaks are expected to increase with warming³⁵.

As a result of a changing climate, Idaho is likely to experience shifts to non-forest vegetation types (e.g., shrublands) where hotter, drier conditions can no longer support forest vegetation³³. Projections also indicate that southern Idaho will see the expansion of deserts and the northern part of the state may experience the loss of forests³³.



Idler's Rest, Moscow Mountain, by Aleksandra Hollingshead, 2017



Sunset in Moscow by Kristin Haltinner, 2020

Economic Impacts

Economic impacts of climate change are difficult to predict. The results presented here are incomplete and subject to some uncertainty. A forthcoming report by the University of Idaho McClure Center will describe the economic impacts of climate change throughout Idaho in greater detail³⁹.

Overall, climate change is expected to have a negative impact on global and US economies. Increased costs are projected to cover damaged infrastructure, property loss, loss of work/labor (Figure 15), and community vitality. Because Idaho's economy relies on natural resources (Figure 16), job loss and financial loss from sales may impact the state. Additionally, costs associated with meeting increased energy demands (i.e., cooling), wildfires, and public health crises will impact local communities²⁵. Crime rates may also increase¹⁷. Other studies suggest that costs of energy and cold-related mortality will be reduced¹⁷.

There is some indication that climate change will positively impact crop production in Idaho for several decades into the future^{17,23,24}. However, other climate change effects including increased pests and reduced summer streamflow and irrigation²⁵ were not included in these studies. Warming may decrease livestock productivity²⁵.

Other potential expenses, for which there is little data for analysis, include replacing infrastructure as a result of destructive fires or floods, flood cleanup, and managing the waste-water system in light of regional, seasonal floods. These findings will be clarified in the McClure Center Report scheduled for release in 2021.

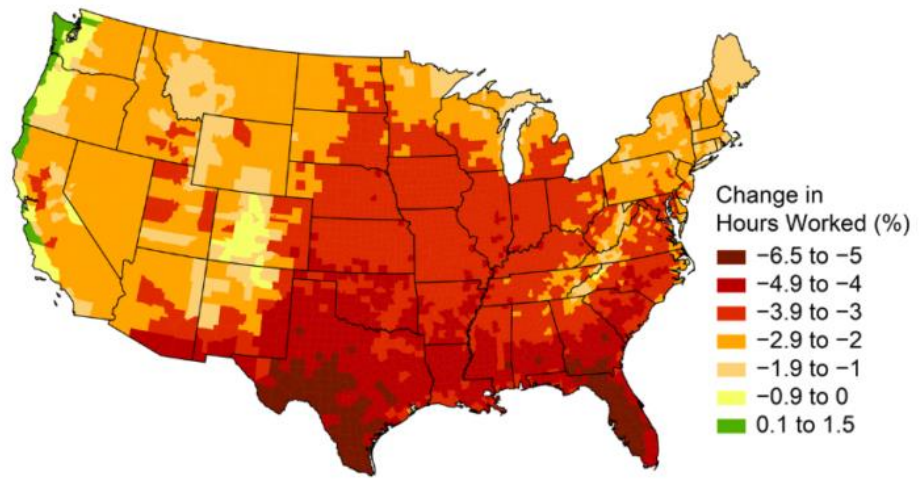


Figure 15. Percent change in hours worked in 2090 in response to projected warming using a higher emissions scenario (RPC8.5) for high-risk industries only (which are defined as agriculture, forestry, and fishing; hunting, mining, and construction; manufacturing, transportation, and utilities). Source: USGCRP, 2018.

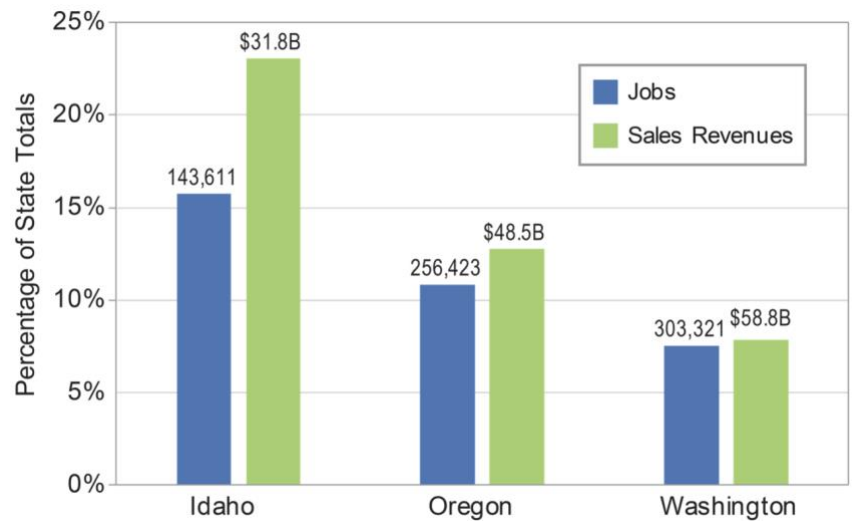


Figure 16. Natural resources are a key part of Idaho's economy. Sales for agriculture, forestry, and fisheries sectors based on 2015 data. Source: USDA Forest Service and Boise State University and USGCRP, 2018.

Additional Resources

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