

DOE – Tribal Energy Program



Tlingit-
Haida
Regional
Housing
Authority

“First Steps” Toward Tribal
Weatherization

Human Capacity Development

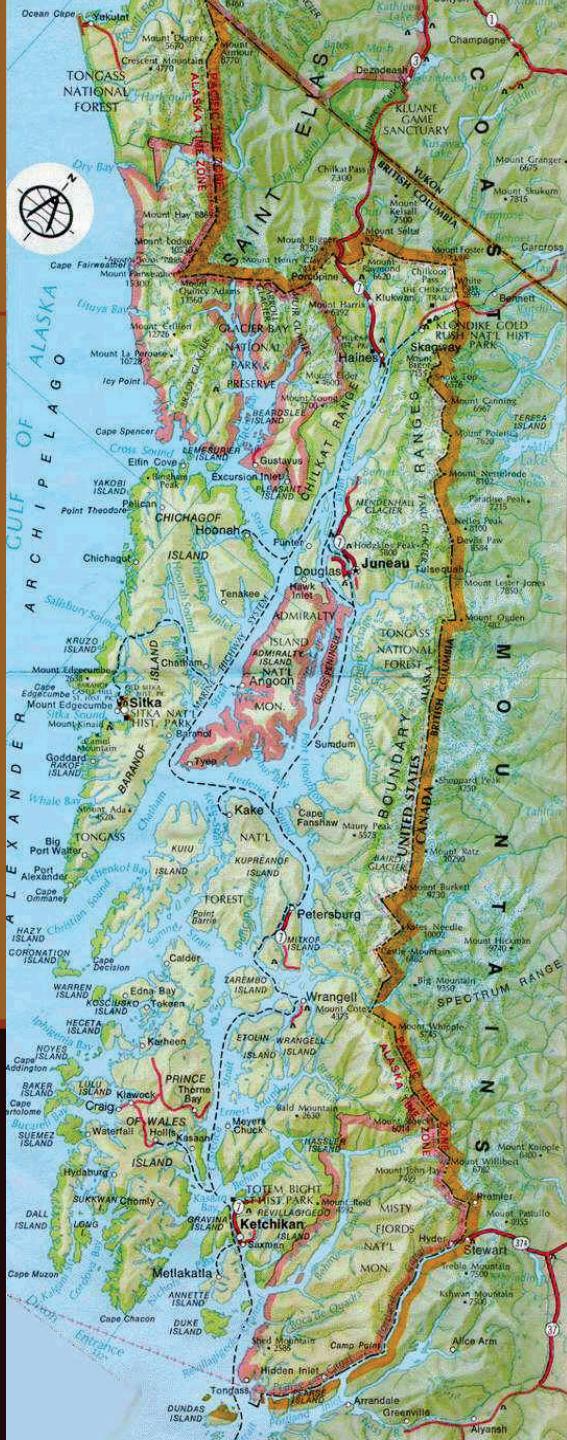
Denver, CO. November 20, 2009

Craig Moore

Alaska's Native People

Over 10,000 Tlingit and Haida live in
SE Alaska





Southeast Alaska Communities



Yakutat

Klukwan

Haines

Angoon

Sitka

Juneau

Kake

Petersburg

Klawock

Kasaan

Craig

Hydaburg

Ketchikan

Saxman

Hoonah

Wrangel

OUR TRIBAL PARTNERS

Yakutat Tlingit Tribe

Skagway Traditional Council

**Central Council of Tlingit & Haida
Indian Tribes of Alaska**

Douglas Indian Association

Angoon Community Association

Craig Community Association

Klawock Cooperative Association

Organized Village of Kake

Organized Village of Kasaan

Petersburg Indian Association

Organized Village of Saxman

Wrangell Cooperative Association

Annual Heating Degree Days

Total of Mean Daily Average below 65 F



San Francisco CA	3,016
Oklahoma City, OK	3,659
New York, NY	5,080
Denver, CO	6,020
Ketchikan, AK	7,155
Missoula MT	7,792
Sioux Falls, SD	7,809
Juneau, AK	8,800
Fargo, ND	9,254
Fairbanks, AK	13,940
Barrow, AK	20,226

SE Alaska – Islands, Sea, Forest, Fish, andRain

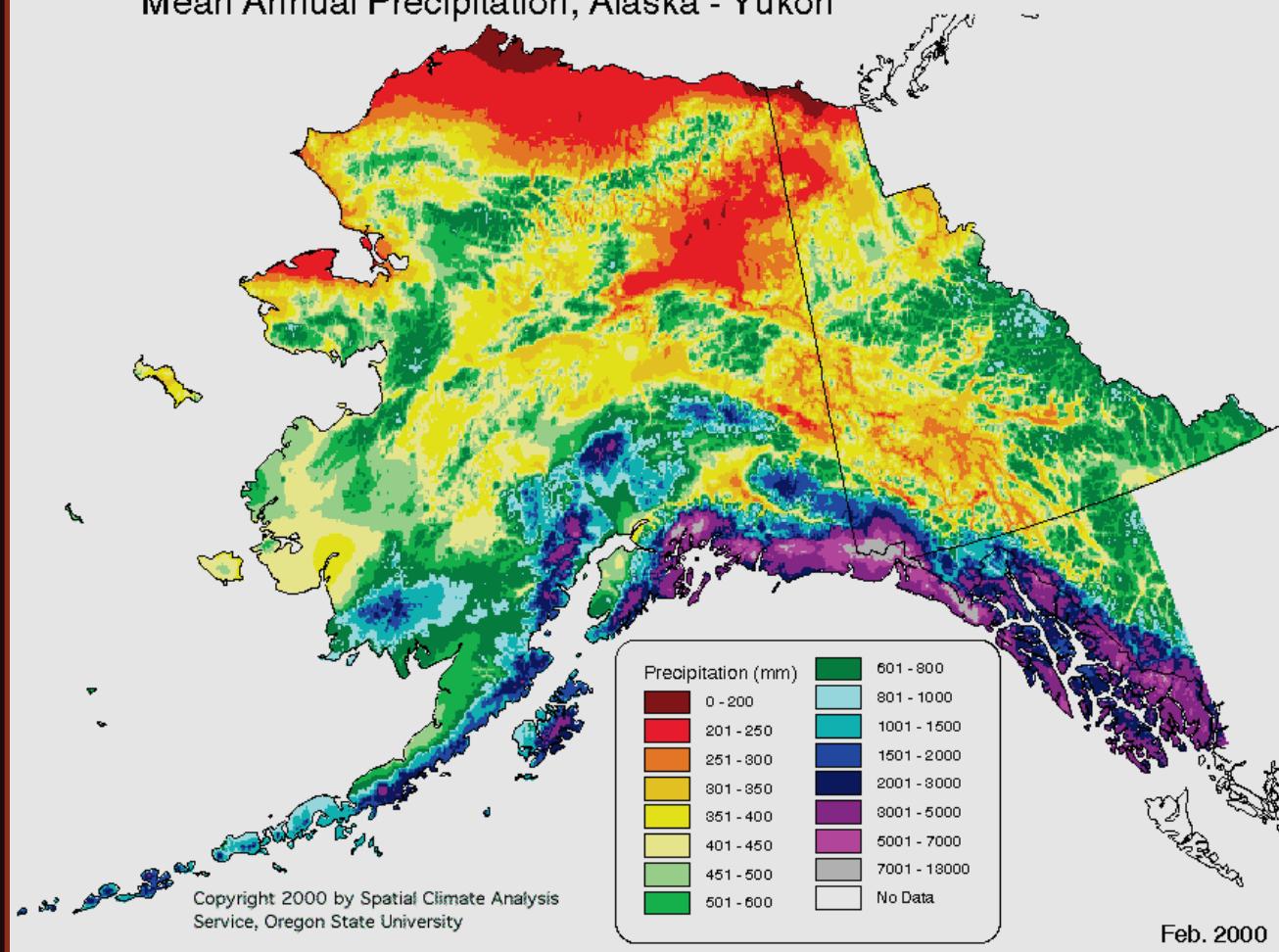


08.02.2004

Rainfall in areas of SE Alaska - over 160 inches annually



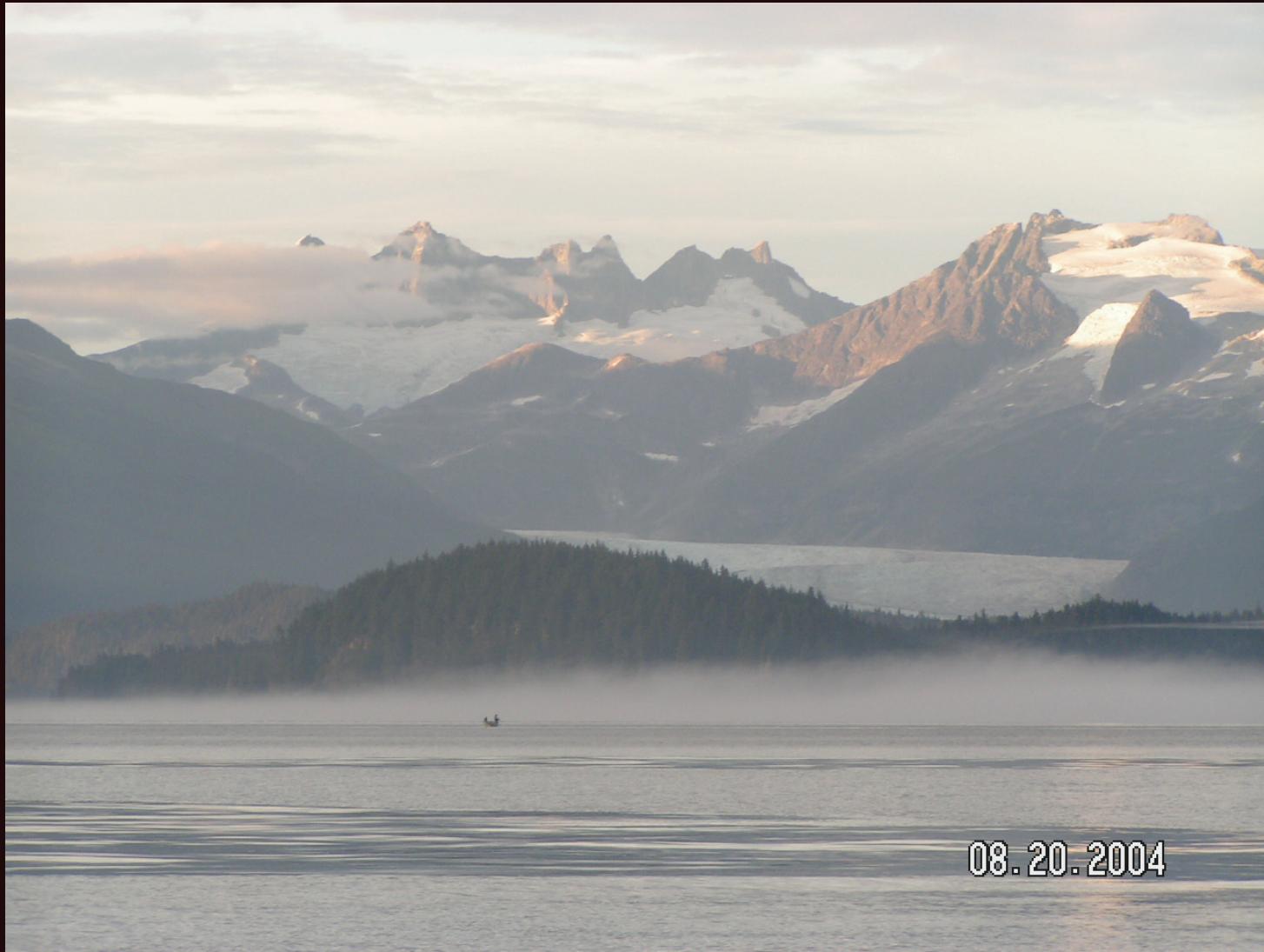
Mean Annual Precipitation, Alaska - Yukon



WEATHER

- WIND
- RAIN (LOTS OF IT)
- SALT AIR
- HIGH HUMIDITY
- FREEZE-THAW CYCLE
- SEVERE WEATHER

Also... mountains and glaciers



08.20.2004

A land of rich traditions, culture and art



Cape Fox dancers
Beaver House, Saxman



1904 Potlatch – Kaagwaantaan Wolf
House, Sitka

Villages were built by the sea, the sea
being our highway



881 KLIN-QUAN, INDIAN VILLAGE ALASKA

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Typical SE Alaska building site.
Upland wetlands, forest, and
overburden on bedrock soils



Southeast
Rainforest



Freeze/thaw cycle



In the summer, shiploads of tourists visit the Inside Passage...



In the winter, locals enjoy the peace without tourists



Haines
Senior
Housing

In the summer, THRHA's NAHASDA crews go to work repairing houses...



...except when it rains, we use a lot
of plastic



Driving rains cause window leaks,
causing siding and wall decay



Roof leaks can lead to moldy insulation and ceiling damage



Leaks cause decay, mold and mildew.
These cans are no match for this
window leak.



The Village of Hydaburg on Prince of Wales Island. Population 340



Typical HUD home in Hydaburg





Typical mold and mildew



Mac Pearce (a.k.a “Dr. Mold”) joyfully inspects for mold spores in a crawlspace



Plumbing leaks, ground water
seeping at foundation, damaged
insulation, pest intrusion



High humidity causes
mold and mildew spores



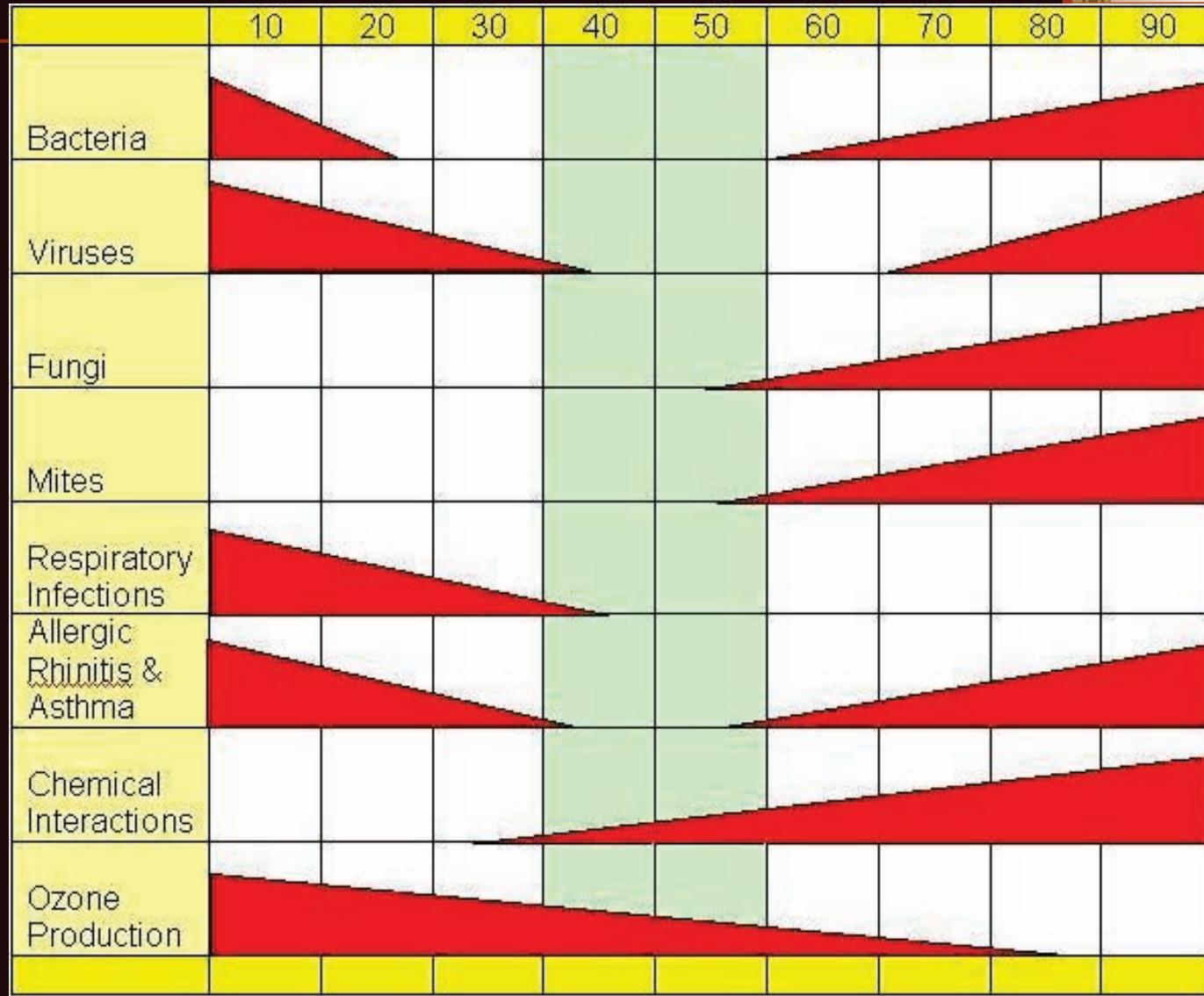
Leaks and high humidity can saturate wood joists, leading to decay.



Iridescent spores on a crawl space trap excited Mac



Optimum Relative Humidity Range = 45% to 55%



Lack of homeowner maintenance can exacerbate problems



Professor Marquam George inspects
mildew on house siding.



Professor Marquam and assistant inspect mildew and fan in bathroom



Craig and Mac check exhaust fan flows (only 13 CFM flow).



Unused ERV fan collects dust...



...probably because it never worked right. Installer did not follow instructions, nor test to see if it worked.



HRV's are energy efficient, but require maintenance, pull 36 watts, and homeowners often shut them off.



A Toyo kerosene space heater and a wood stove heat this home...barely.



A THRHA HUD home in Angoon is already fairly efficient



...but the traditional tribal homes in Angoon need a lot of work to make them efficient



We develop partnerships with building professionals



THRHA's New Construction exceeds
the State of Alaska Building Energy
Efficiency Standard (BEES)



R-38 plus R-11 batt ceiling insulation

Ketchikan - Five Star Plus



Ketchikan Outside Insulation Technique



Ketchikan Five Star





Five Star Plus homes in Juneau



**Shelter for our
People**



Tlingit-
Haida
Regional
Housing
Authority

THRHA's Weatherization Program

Yupik Sponsor



Senator Lyman Hoffman from Bethel sponsored legislation to weatherize homes in Alaska

Senator Lyman Hoffman, Bethel

AHFC Administration



The Alaska Legislature authorized \$360 million to AHFC to administer Energy Efficiency and Weatherization Programs in Alaska

Lyman Weatherization Program



Low Income Weatherization Program

- Available only to households below 100% MFI
- Free weatherization for eligible families
- \$10,000 limit per home in SE Alaska

Lyman Weatherization Program



RurAL CAP also
performs WAP work in
Juneau

ACDC also performs
WX work in other SE
Communities



FY 2008 HUD Income Limits for ALASKA

Effective
April 15,
2008

100 Percent of Adjusted Median Income (Updated 08/04/08)

Community Name	INCOME LIMIT - 1 PERSON	INCOME LIMIT - 2 PERSONS	INCOME LIMIT - 3 PERSONS	INCOME LIMIT - 4 PERSONS	INCOME LIMIT - 5 PERSONS	INCOME LIMIT - 6 PERSONS	INCOME LIMIT - 7 PERSONS	INCOME LIMIT - 8 PERSONS
Anchorage Borough	55,100	63,000	70,800	78,700	85,000	91,300	97,600	103,900
Aleutians East Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Aleutians West Census	62,600	71,500	80,500	89,400	96,600	103,700	110,900	118,000
Bethel Census Area	53,800	61,500	69,200	76,900	83,100	89,200	95,400	101,500
Bristol Bay Borough	51,300	58,600	66,000	73,300	79,200	85,000	90,900	96,800
Denali Borough	60,600	69,200	77,900	86,500	93,400	100,300	107,300	114,200
Dillingham Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Fairbanks North Star Borough	49,900	57,000	64,200	71,300	77,000	82,700	88,400	94,100
Haines Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Juneau Borough	60,900	69,600	78,300	87,000	94,000	100,900	107,900	114,800
Kenai Peninsula Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Ketchikan Gateway Borough	51,000	58,300	65,600	72,900	78,700	84,600	90,400	96,200
Kodiak Island Borough	51,200	58,500	65,800	73,100	78,900	84,800	90,600	96,500
Lake and Peninsula Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Matanuska-Susitna Borough	49,300	56,300	63,400	70,400	76,000	81,700	87,300	92,900
Nome Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
North Slope Borough	58,300	66,600	75,000	83,300	90,000	96,600	103,300	110,000
Northwest Arctic Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Prince of Wales (outer Ketchikan)	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Sitka City & Borough	54,000	61,800	69,500	77,200	83,400	89,600	95,700	101,900
Skagway-Hoonah-Angoon	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Southeast Fairbanks Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Valdez-Cordova Census	52,200	59,700	67,100	74,600	80,600	86,500	92,500	98,500
Wade Hampton Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Wrangell-Petersburg Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Yakutat City & Borough	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000
Yukon-Koyukuk Census Area	47,700	54,600	61,400	68,200	73,700	79,100	84,600	90,000

100% MFI - Angoon Family of 4 = \$68,200

THRHA Weatherization Program



THRHA PRIORITIES FOR WEATHERIZATION

- Elders First
- Families With Disabilities
- Communities with high energy costs
- THRHA crew capacity in place

THRHA Weatherization Program



THRHA CREWS RECEIVE WX TRAINING FROM ALASKA WORKS PARTNERSHIP AND UAS

- Blower Door Certifications
- Weatherization Tech I and II
- Ventilation Workshops
- AkWarm Software certifications
- Combustion Safety Testing

WEATHERIZATION TRAINING FOR HOUSING AUTHORITIES & WEATHERIZATION ENTITIES

Weatherization Tech 1

Juneau
November 10-14, 2008

Sponsored by Alaska Housing Finance Corporation

This Weatherization Training Course will teach basic skills for persons who will perform weatherization work on homes. Persons attending courses must have a minimum of six months experience in residential construction activities and will be employed weatherizing homes. Course components are: blower door, air sealing, installation techniques, and AkWarm.

Persons registering for this course must be referred by: AHFC, Rural Cap, THRHA, Alaska CDC, or a Weatherization Service Area Provider. If there are additional slots available, private contractors may apply.



Alaska Housing
FINANCIAL CORPORATION

Weatherization Training
Monday—Friday Nov. 10-14th, 2008
Juneau @ Plumbers and Pipefitters
1751 Anka St.
(907) 586-2874
Instructors:
John Woodward, Phil Kuluwa, Ginny Moore

For more information contact Dan Rednall @ Alaska Works Partnership, Inc.
1-866-297-9566 toll free

Alaska Works Partnership, Inc. is a non-profit organization assisting Alaska Housing Finance Corporation with recruitment and logistics for weatherization training statewide.



THRHA Weatherization Program



WX Trainees in Hydaburg



WX Assessments



Blower Door
tests are
performed
to check for
air leakage

WX Assessments



Attics are
inspected

WX Assessments

Crawl Spaces
are inspected



WX Assessments



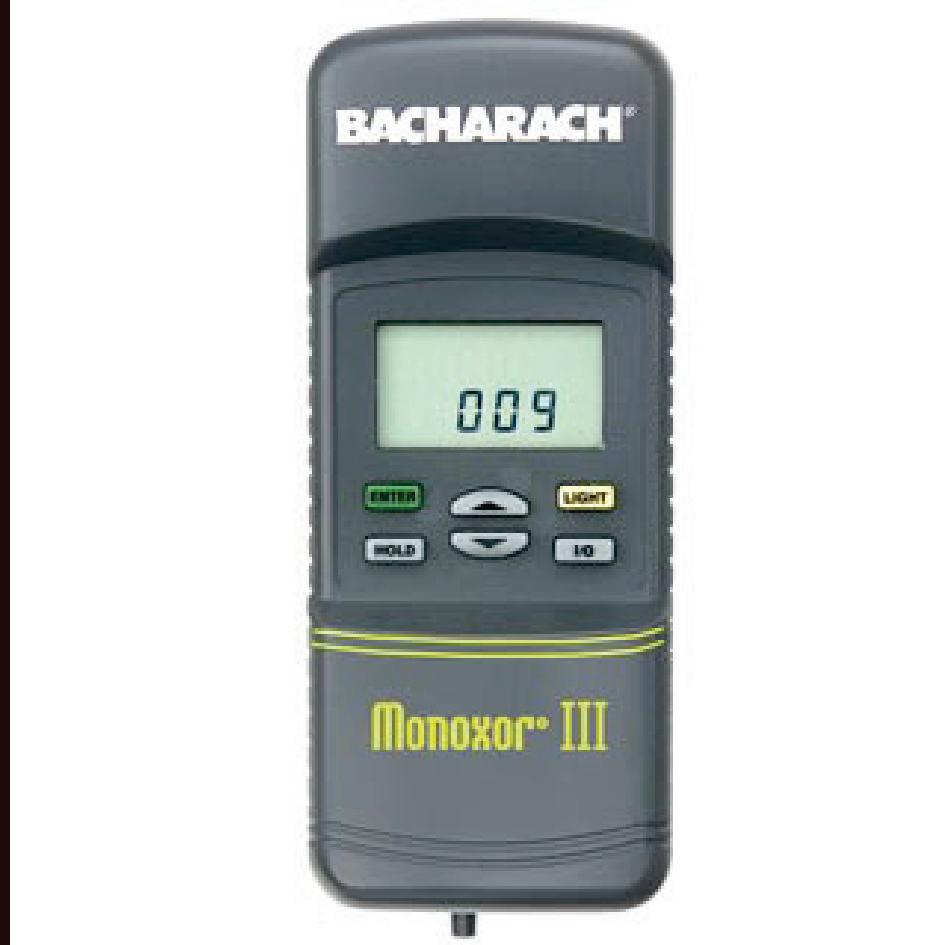
Heating Systems
are inspected.

CO is
monitored.

Worst Case CAZ
tests are
performed.



CO detectors for Worst-Case Combustion Appliance Zone (CAZ) testing



WX Assessments

AS-IS Energy Ratings are performed with AkWarm software on each home at initial assessment



HOME ENERGY RATING CERTIFICATE

The Home Located At:
129 Reid St.
Wrangell, Alaska

Has Been Energy Rated As
★★★ +
One Star Plus

Overall Efficiency of Home
40.5 points

Your Home 

UNOFFICIAL

Projected Annual Energy Costs
\$7,171 per year

Amount of CO2 Produced by the Home
23,946 pounds per year

BREAKDOWN OF HEATING COSTS

Category	Cost (\$ per Year)
Floor	~300
Wall/Door	~800
Window	~500
Ceiling	~300
Air/Vent	~1300
Htg System	~1200
Hot Water	~1100

Client: Michael Rater: Craig Moore Date: 2/10/04
Rater's City: Wrangell, AK 99802 Phone: 907-586-1040 FAX: 907-596-9519
Rater's Library: 9/19/2008

WX Assessments



■ AkWarm Improvement Options Report shows energy savings and point increases to be expected.

ENERGY EFFICIENCY IMPROVEMENT OPTIONS

Property: Kevin
Jurasu, Alaska County

Rater: Craig Moore

House: Single Family
Living Floor Area: 1,281 square feet
No Attached Garage

Rating: As Is
ID: FCB-

COST-EFFECTIVE IMPROVEMENTS:

Improvement Description	Location	Savings to Cost Ratio	Installed Cost	Annual Savings	Break-Even Cost	Rating Points Gained	Note
Caulk and Seal so that Home Air Leakage is Reduced by 500 CFM at .50 Pascals.		3.74	\$500	\$267	\$1,870	5.7	1
Fill partially filled 2x4 cavity with R-11 loosefill	Exposed Floor: House	3.19	\$838	\$157	\$2,033	3.1	2
Install R-19 wood-fil insulation in roof	Ceiling w/ Attic: House	2.74	\$813	\$172	\$2,232	3.5	3
Install R-14 rigid foam board to exterior and cover with 1x1 siding or equivalent.	Above-Grade Wall: House	1.97	\$2,020	\$308	\$3,988	6.1	4
Replace existing window with double pane, low E, argon vinyl window	Window/Skylight: House aluminum	1.83	\$1,911	\$270	\$3,500	5.4	5
Replace existing window with double pane, low E, argon vinyl window	Window/Skylight: House patio french	1.10	\$1,005	\$85	\$1,105	1.8	6
Total Cost-Effective Measures		2.14	\$6,886	\$1,280	\$14,728	25.6	

New Rating After Measures: Three Stars Plus, 73.3 points
Annual CO₂ Reduction: 5,137 pounds per year

General Notes: All the costs (generally by AkWarm) are for general reference only, and are not intended to be accurate at current market rates. You should contact qualified professionals for actual quotes. As you tighten and insulate the home, there is a potential for changes in indoor air quality and safety. These changes could result in higher levels of moisture retained in the home, and high levels of Volatile Organic Compounds (VOC's), and other contaminants remaining in the home. You should consider better ventilation strategies such as improved bathroom or kitchen fans, Heat Recovery Ventilators (HRVs) and make-up air vents. Your energy rater can advise you better after testing if a home after you complete your air-tightening improvements. In any case, you should install a good quality carbon monoxide (CO) detector in the home, including a low-level exposure reading, to protect the family against CO poisoning from your wood fireplace.

Improvement Notes

- 1 - Start sealing at the top (attic) and work down to the floor (crawl space). Check that the wood fireplace does not backdraft as you seal off, and once sealing is completed, perform a worst-case depressurization test on the wood stove by turning on all exhaust appliances in the home to assure smoke does not backdraft down chimney. Contact a wood stove professional for other air-tight fireplace options. If the existing fireplace backdrafts on the depressurization test, Seal all penetrations in top and bottom plates at plumbing and wiring penetrations with minimal expanding foam, backer rod, gaskets and/or caulk. Replace the attic access hatch with minimum 5/8" plywood.

70 CFM Continuous duty-rated lo-sone
bathroom exhaust fans on programmable
timers. 18 watts



Cellulose Blowing machines with dense-pack attachments



Local WX workers trained in Yakutat



Blown in cellulose to minimum
R-40 in attics



Blown in cellulose to minimum R-30 in
floor, with 1" rigid beadboard
insulation under floor joists.



Oil boilers are serviced and tested for efficiency. Average 84% AFUE



New Smoke Alarms and CO detectors placed in each home weatherized.



Correct window flashing on outside insulated home



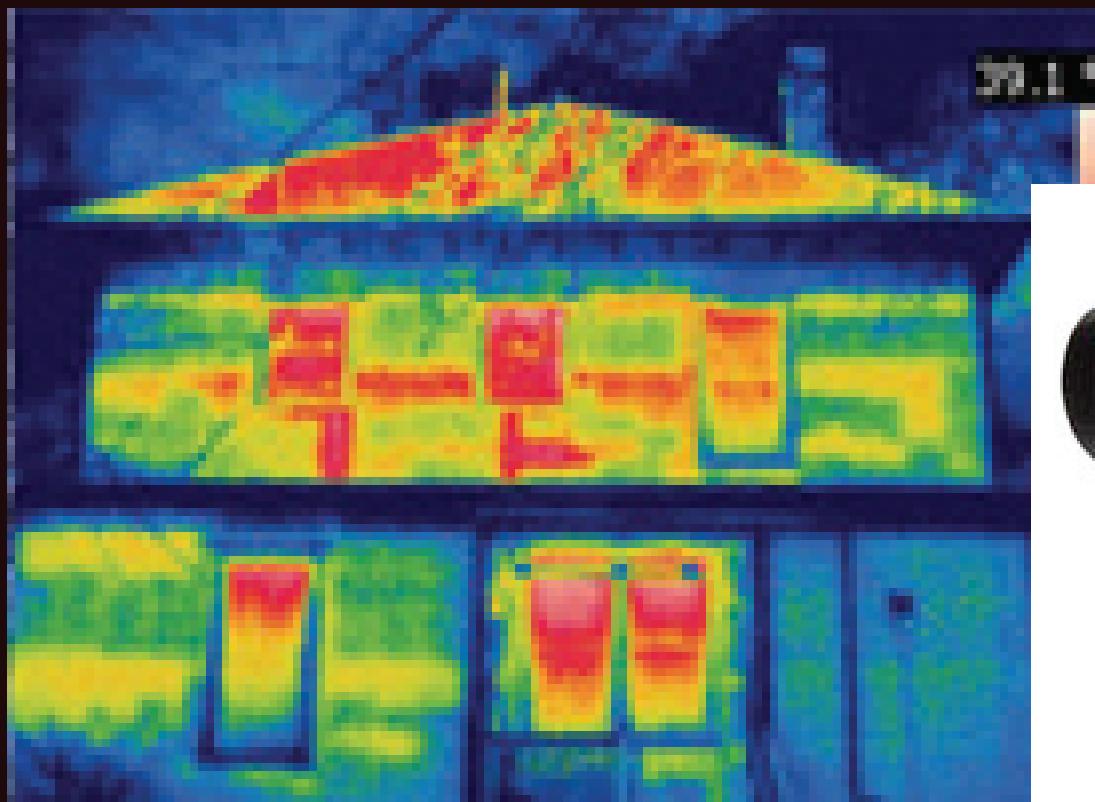
All window flashing is weatherlapped to direct flow away from the structure



Weatherization stickers are placed inside electrical panel.



Infrared Thermal Imaging Cameras



GOALS OF DOE “FIRST STEPS” IN WEATHERIZATION TRAINING GRANT



ALASKA NATIVE WEATHERIZATION AND JOBS PROJECT

1. Provide WX training for up to 50 Alaska Natives from SE Alaska Communities
2. Provide up to 25 paid apprenticeships and on-the-job training opportunities for successful trainees
3. Employee trained personnel to weatherize over 1,000 homes in SE Alaska villages

GOALS OF ALASKA NATIVE WEATHERIZATION AND JOBS PROJECT



Training will prepare participants in three weatherization –related occupations:

Installers

Crew Chiefs

Auditors (assessors)



- UNIVERSITY OF ALASKA SOUTHEAST (UAS) will teach tribal members in the DOE Core Competencies for the Weatherization Assistance Program (WAP).

- Course will incorporate Building Performance Institute (BPI) standards



- Training will include 5-day, 40 -hour intensive training at UAS construction labs in Juneau and Ketchikan
- Distance education modules will be used during on-the-job training components.
- Students will get hands-on experience weatherizing actual homes under supervision

DOE CORE COMPETENCIES for
WAP



Core Competencies for the Weatherization Assistance Program

Developed
By:

The Weatherization Trainers Consortium
For:

U.S. Department of Energy
Weatherization Assistance Program

March 26, 2007



Core Competencies include

- **Basic competencies,**
- **Safe work practices,**
- **Building evaluation,**
- **Measure installation,**
- **Final inspection,**
- **Consumer education,**
- **Monitoring,**
- **Program management, and**
- **Training.**

Building Performance Institute (BPI) standards for shell components



BUILDING PERFORMANCE INSTITUTE TECHNICAL STANDARDS FOR CERTIFIED SHELL SPECIALISTS

Health and Safety

Personal Safety

All technicians performing diagnostic tests, inspections, or installations, must have access to all necessary personal safety equipment required by OSHA. Required safety equipment includes, but is not limited to:

- ✓ Fitted respirators with canister filters
- ✓ Dust masks
- ✓ Gloves
- ✓ Protective clothing
- ✓ Safety glasses
- ✓ Hard hats, as required

Technicians must be trained in proper use and applications for these devices and must adhere to OSHA regulations when on the job site.

All hand tools, power tools, ladders, and diagnostic equipment must be handled and used in a safe manner and kept in good working condition. Equipment and diagnostic tools must be maintained and calibrated according to manufacturer's specifications.

A copy of the Material Safety Data Sheets (MSDS) for all materials used on the job and installed in the home, must be kept on each crew vehicle and made available to all workers and clients upon request.

Where the presence of asbestos, lead, mold and/or other known or suspected hazardous material is present, all relevant state and federal (EPA) guidelines must be followed to ensure technician and occupant safety. Blower door depressurization tests may not be performed in homes where there is a risk of asbestos becoming airborne and being drawn into the dwelling.

Building Performance Institute (BPI) standards worst case for CAZ testing



COMBUSTION SAFETY TEST PROCEDURE FOR VENTED APPLIANCES

- Measure the Base Pressure.** Start with all exterior doors and windows closed and the fireplace damper closed. Set all combustion appliances to the pilot setting or turn off the service disconnect. Combustion appliances include: boiler, furnace, space-heaters, and water heater. With the home in this configuration, measure and record the baseline pressure of the mechanical room WRT outside.
- Establish the Worst Case.** Turn on the dryer and all exhaust fans. Close all interior doors that make the CAZ pressure more negative. Turn on the air handler, if present, and leave on if the pressure in the CAZ becomes more negative, then recheck the door positions. Measure the net change in pressure from the CAZ to outside, correcting for the base pressure. Record the "worst case depressurization" and compare to the CAZ Depressurization Limit Table.
- Measure Worst Case Spillage, Draft, CO.** Fire the appliance with the smallest Btu capacity first, test for spillage at the draft diverter with a mirror or smoke test, and test for the CO at the flue at steady-state (if steady state is not achieved within 10 minutes, take the CO readings at the 10 minute mark). If the spillage test fails under worst case, go to Step 4. If spillage ends within 1 minute, test the draft in the connector 1' - 2' after the diverter or first elbow. Fire all other connected appliances simultaneously and test the draft diverter of each appliance for spillage. Test for CO in all appliances before the draft diverter.
- Measure Spillage, Draft, CO under Natural Conditions.** If spillage fails under worst case, turn off the appliance, the exhaust fans, open the interior doors and allow the vent to cool before re-testing. Test for CO, spillage, and draft under "natural conditions." Measure the net change in pressure from worst case to natural in the CAZ to confirm the "worst case depressurization" taken in Step 2 outside. Repeat the process for each appliance, allowing the vent to cool between tests.
- Ambient CO.** Monitor the ambient CO in the breathing zone during the test procedure and abort the test if ambient CO goes over 35 ppm. Turn off the appliance, ventilate the space, and evacuate the building. The building may be reentered once ambient CO levels have gone below 35 ppm. The appliance must be repaired and the problem corrected prior to completing the combustion safety diagnostics. If the ambient levels exceed 35 ppm during testing under natural conditions, disable the appliance and instruct the homeowner to have the appliance repaired prior to operating it again.
- Action Levels.** Make recommendations or complete work order for repairs based on test results and the Combustion Safety Test Action Level Tables.

RANGES AND OVENS*

- Remove any items/foil in or on oven/range top
- Make sure self-cleaning features are not activated
- Test oven in vent sleeve, before dilution air
- 100 ppm to 300 ppm** as measured you must install a carbon monoxide detector and recommendation for service must be made to the consumer.

Greater than 300 ppm as measured—the unit must be serviced prior to work. If greater than 300 ppm after servicing, exhaust ventilation must be provided with a capacity of 25 CFM continuous or 100 CFM intermittent.

*Continually monitor ambient CO levels during test

Weatherization – Warm, safe and affordable homes for our people





U.S. DEPARTMENT OF
ENERGY



THRHA and DOE – Weatherizing Homes



GUNALCHEESH (Tlingit)

HAW' AA (Haida)

THANK YOU, THANK YOU VERY
MUCH (Elvis)