

**Healthy Home Assessment Program:
The Wampanoag Environmental Life Learning (W.E.L.L.)
Initiative**

Wampanoag Tribe of Gay Head (Aquinnah)
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1. Introduction

In 2006, as part of the Wampanoag Environmental Life Learning (WELL) Initiative, the Wampanoag Health Service (WHS) in collaboration with the WTGH (A) Department of Natural Resources conducted an environmental health survey among Tribal members. This survey was based on CDC's Protocol for Assessing Community Excellence in Environmental Health (PACE EH), which "offers guidance to public health official for conducting community-based environmental health assessments to

- identify environmental health issues,
 - prioritize the identified issues,
 - develop action plans, and
 - evaluate the progress to address selected issues."
- [\(http://www.cdc.gov/nceh/ehs/ceha/\)](http://www.cdc.gov/nceh/ehs/ceha/)

This survey identified key environment concerns within the tribe, including many issues related to indoor air quality, such as mold, asthma and smoking. Based on the concerns surrounding mold and the known challenges of preventing and remediating mold on the Island, the WHS, under the leadership of Ron MacLaren, initiated the development of a Healthy Home Program to achieve the following goals:

- To develop a mitigation program that will assess and remediate mold and moisture problems within the homes of tribal members living on Martha's Vineyard;
- To develop a moisture and mold assessment tool that allows for the identification, quantification and prioritization of moisture and mold risk within the homes of tribal members living on Martha's Vineyard;
- To develop a framework for program implementation, which includes assessment, remediation, follow-up, evaluation and closeout;

This report contains the basic tools necessary to assess moisture and mold problems within Tribal homes and provides some guidance for professional remediation.

NOTE: While Sections 4 and 5 contain some basic guidance on best practices for avoiding mold growth in homes, please refer to "The Mold Survival Guide: For Your Home and for Your Health" and "Jeff's May's Healthy Home Tips" (author Jeffrey C. May, The Johns Hopkins University Press) for more complete discussions of these topics.

2. User Guide for Healthy Home Assessment Tool

Instructions for Assessors

When assessing a property, wear protective clothing that is weather appropriate. Carry several two-strap, NIOSH N 95 masks with you, and wear one when entering a potentially moldy environment. Secure long hair so it won't get in the way. If you have asthma, allergies or other environmental sensitivities, tie long hair up and cover with a hat. If entering a moldy crawl space, wear a Tyvek suit and a P-100 half-face respirator.

Start at the exterior, then move to the main levels of the house. Save the basement and/or crawl space for last, as this space is likely to contain mold growth. If the house has an attic, look at that before descending to the basement. Be careful not to disturb what may be mold growth.

If the assessment took you into potentially moldy areas of a house, when you return to your home or office, take off the clothing you wore at the site, including shoes or boots. Do this if possible in an outside hallway or bathroom, rather than in your workspace or living room. The clothing should be washed as appropriate. Wash your hair, because it can pick up allergens, including mold spores.

NOTE

These instructions are not intended to provide medical or legal advice. The services of a competent professional should be obtained whenever medical, legal, or other specific advice is needed. This document contains no warranty - either expressed or implied - regarding the recommendations offered or the practices described. The creators of this document and the organization that supplied the document do not assume any liability for any consequences arising from the use of the content of this document. The lists and descriptions below are not all-inclusive, and the remediation summaries are not intended to serve as remediation protocols.

3. Healthy Home Assessment Tool

The following pages contain the full in-home healthy home assessment tool. Section I is focused on survey questions to be answered by an adult living in the home. Section II is focused on visual observations and objective measurements within around the home.

Survey questions and inspections items that are relevant to the scoring and prioritization tool in Section 4 are highlighted in red.

PRE-REMEDICATION HEALTHY HOME ASSESSMENT
Developed for the Wampanoag Tribe of Aquinnah, MA.
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Occupant(s)' Name(s) _____

E-mail address _____

Phone _____

Address of Property _____

Interviewer's Name: _____

Survey number: _____

Date: _____

Weather: Outside temperature _____

Outside relative humidity _____

Weather conditions (clear, foggy, raining, snowing) _____

Weather conditions on the prior two days _____

SECTION I to be answered by occupant in conversation with interviewer. All questions referring to conditions in the home should be answered based on last 12 months (e.g., "Have you seen any mold growth?")

SECTION II to be filled in through inspection of site. *Home occupants should be instructed to take the following steps one hour prior to the site visit: keep windows and doors closed, including those leading from room to room; and don't cook anything- like toast or bacon - that will fill the house with strong smells.*

SECTION I. ANSWERS GATHERED FROM THE OCCUPANTS

A. BASIC OCCUPANT INFORMATION AND HEALTH SYMPTOMS

We would like to collect some information about the members of your household and their health.

A1. How long has your family lived in the house? _____

A2. Is your home occupied by your family year-round (excluding vacations)? YES
NO

If "NO", please identify the months when the home is occupied by your family:

COMMENTS	_____	JAN-MAR
	_____	APR-JUN
	_____	JUL-SEP
	_____	OCT-DEC

A3. Do you typically leave your home for extended periods each year (a month or more)? YES NO

If so, during which seasons?

JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC

A4. How many people (adults and children) live in your home permanently?
_____ Adults
_____ Children (under 18)

A5. How many people (adults and children) are living in your home temporarily?
_____ Adults
_____ Children (under 18)

A6. Are any occupants experiencing asthma or other respiratory symptoms, or frequent sinus infections? YES NO

If "YES",

A6a. Are any of these people children (under 18)? YES NO

A6b. Are two or more people in the house suffering? YES NO

B. THE OCCUPANTS' LIFESTYLE CHOICES: PETS, SMOKING, CLEANING

QUESTION	YES	NO	COMMENTS
B1. Are there pets in the household?			
IF YES, which and how many? B1a. Cats. How many? _____ B1b. Dogs. How many? _____ B1c. Birds. How many? _____ B1d. Other. How many? _____			
B2. Does anyone regularly smoke inside the house?			
B3. Does anyone in the family use clothing detergent that lists enzymes on the ingredient label?			
B4. Does anyone burn jar candles?			
B5. Does anyone in the family use heavily fragranced laundry or body products?			
B6. Does the family use a HEPA vacuum cleaner?			
B7. Does the family use a bagless vacuum cleaner?			
B8. How often is the home vacuumed?			Daily Weekly Other frequency: _____
B9. How often is the home dusted?			Daily Weekly Other frequency: _____
B10. Are the carpets power or steam cleaned?			How Often: _____ By: Resident Professional

C. THE OCCUPANTS' EXPERIENCES IN THE PROPERTY

EXTERIOR

WATER CONTROL

QUESTION	YES	NO	COMMENTS
C1. Have you ever had water in the basement after a heavy rain?			
If YES: C1a. How often, approximately? _____ C1b. When was the last time? _____ C1c. How much water? _____			
C2. Have you ever had water leak into the house in the winter from melting snow on the roof?			
If YES: Where? _____			

INTERIOR

C3. IS THE BASEMENT FINISHED OR UNFINISHED?

QUESTION	UNFINISHED		FINISHED		BOTH	COMMENTS
	YES	NO	YES	NO		
C4. Is the basement damp?						
C4a. If YES, during what seasons or weather?						
C5. Have you observed condensation on the basement walls?						
C5a. If YES, during what seasons or weather?						
C6. Have you seen any mold growth?						
C6a. What color was it? _____						
C6b. Where did you see the mold? _____						
C6c. During what season(s) does it grow? _____						
C6d. Have you tried to clean the moldy area(s)?						
C6e. How did you try to clean the moldy areas? _____						
C6f. Did the mold grow back?						
C6g. Ever throw anything out that was moldy?						
C6h. What did you throw out? _____						
C6i. Where was each object located when it got moldy? _____						
C7. Does the basement ever smell musty?						
C7a. If YES, when does the smell seem worse? _____						
C8. Do you spend time in the basement?						
C9. Do you or have you ever cut wood in the basement?						
C10. Do you leave the door between the basement and upstairs open?						
C10a. If yes, when, usually? _____						
C10b. And for how long? _____						
C11. Do you use the basement for storage?						
C12. Ever had any pipe leaks?						
C13. Had any floor water from a broken pipe or water heater?						
C14. Do you operate a dehumidifier in summer?						
C14a. If YES, where and when? _____						
C14b. If the dehumidifier has a bucket, how often do you empty the bucket? _____						

ANSWER THE FOLLOWING QUESTIONS FOR **FINISHED BASEMENTS ONLY**

QUESTION	YES	NO	COMMENTS
C15. Do you heat the finished basement in the winter?			
C15a. At what temperature do you set the thermostat? _____			
C16. Do you keep the space warm when you're not in the basement or not at home?			
C17. Have you ever seen condensation on tile or linoleum floors?			

C18. DOES THE HOME HAVE A **CRAWL SPACE**? YES NO **If NO, skip to next section.**

QUESTION	YES	NO	COMMENTS
C19. If you have a crawl space, do you ever look inside?			
C19a. If yes, how often and why? _____			
C20. Have you ever seen mold in the crawl space?			
C21. Does the crawl space smell musty?			
C22. If there are pipes there, do you know if any have ever leaked?			
C23. Do you store anything in the crawl space?			
C23a. If yes, what? _____			

MECHANICAL SYSTEMS

QUESTION	YES	NO	COMMENTS
C23. Do you know what kind of heating system you have in your home?			
C23a. If yes, what is it? _____			
C24. What temperature do you set the thermostat at in winter? _____			
C25. Do you keep it set at that temperature all the time?			
C25a. If not, when do you turn the heat down or up? _____			
C26. If you have hot-air heat or central air-conditioning: (IF N/A, move to next question)			
C26a. Do you notice any odor from the registers when the heat or cooling turns on? _____			
C26b. Have you ever had the ducts cleaned?			
C26c. If YES, when? _____			
C26d. Do you change the filter in the system?			
C26e. If YES, how often? _____			
C27. Do you have window or wall air conditioners?			
C27a. If YES, do you ever clean the inside(s) of the air conditioning unit(s)?			
C27b. How often? _____			
C27c. Do you ever clean the filter(s) on the air conditioner(s)?			
C27d. How often? _____			
C28. Do you have an exhaust-only ventilation system?			
C28a. If yes, do you run it in the winter?			
C28b. Do you run it in the summer?			
C29. Do you have an air-to-air heat exchanger?			
C29a. If yes, do you run it in the winter?			
C29b. Do you run it in the summer?			
C29c. Do you change or wash the filter on your air-to-air heat exchanger?			
C29d. If YES, how often? _____			
C29e. Do you clean the inside of your air-to-air heat exchanger?			
C29f. If YES, how often? _____			
C30. Do you use a portable humidifier?			
C30a. If YES, when? _____			
C30b. What type do you have? Cool Mist Warm mist Ultrasonic Steam			
C31. Do you use a device to measure the relative humidity in your home (hygrometer)?			
C31a. If yes, what generally is the relative humidity when you are humidifying? _____			

ABOVE GRADE LIVING SPACE: ROOMS WITHOUT WATER

QUESTION	YES	NO	COMMENTS
C32. Have you seen any visible mold?			
On or near windows?			
On walls? Where on walls? _____			
About how many square feet? _____			
On ceilings? In which rooms? _____			
About how many square feet? _____			
C33. Is there a musty smell in the house?			
C33a. If YES, where? _____			
C33b. When (seasons, weather conditions). _____			
C34. Have you tried to clean the moldy area(s)?			
C34a. If YES, how did you try to clean the moldy areas? _____			
C34b. Did the mold grow back? _____			

ROOMS WITH WATER

QUESTION	YES	NO	COMMENTS
C35. Have you ever noticed any plumbing leaks?			
C35a. If YES, where? _____			
C35b. How much water did you have? _____			
C36. Ever had mildew problems in the bathrooms?			
C36a. If YES, during what times of year? _____			
C37. Do you use the bathroom exhaust fan during and after showering or bathing?			
C38. Do you use your kitchen exhaust fan when you cook?			
C39. Do you clean your kitchen exhaust fan metal-mesh filter?			
C39a. If YES, how often? _____			
C40. How many hours a day do you boil liquid on the stove, generally? _____			
C41. Do you ever notice mold on the outside of the refrigerator?			
C42. Do you hang your laundry to dry indoors?			
C42a. If YES, in what room or rooms? _____			

PESTS

QUESTION	YES	NO	COMMENTS
C43. Have you seen or had any of the following in the house?			
C43a. Carpenter ants			
C43b. Mice			
C43c. Bats			
C43d. Cockroaches			
C43e. Ladybugs			
C43f. Other Pests			
Please list. And when? _____			

SECTION II. INSPECTING THE PROPERTY SITE

General

Size of building in square feet _____

Foundation size - length and width _____

Number of bedrooms _____

Number of bathrooms _____

Number of levels _____

Rooms on each level (name rooms/level)

EXTERIOR

WATER CONTROL

QUESTION	YES	NO	COMMENTS
Are there gutters?			
If YES, where are the gutters? Are the gutters full of debris?			
Do the downspouts dump roof water next to the foundation?			
Are there splash marks against the foundation?			
If there are no gutters, is there an overhang of at least a foot?			
Is the ground sloped away from the house?			
If not, where is the ground sloped toward the foundation (rear, front, sides)? _____			

VISIBLE CONDITIONS

QUESTION	YES	NO	COMMENTS
Is there visible decay at the exterior?			
If YES, where? Windows Trim Siding Other _____			
Are there any obvious openings into the house that might allow pests to enter?			
If YES, where? Unscreened attic vents Unscreened crawl space vents Openings around the front stoop Space beneath a garage door Other _____			

INTERIOR LOWEST LEVEL

QUESTION	YES	NO	COMMENTS
Is the house built on a <u>slab</u> ?			
Is there wall-to-wall carpeting in rooms on the slab?			
Is there a <u>crawl space</u> ?			IF Y Complete next SECTION

IF THERE IS A **CRAWL SPACE**, COMPLETE THIS SECTION:

QUESTION	YES	NO	COMMENTS
Can someone enter the crawl space?			
Is there lighting in the crawl space?			
Is there exposed soil?			
Is the soil covered with plastic?			
IF YES, answer the next three questions:			
Is there water or stains to suggest puddles on top of the plastic?			
Are there holes or gaps in the plastic or spaces at the edge?			
Are there stains on top of the plastic where water has puddled?			
Is there a concrete floor?			
Is there exposed fiberglass insulation?			
Is any of the insulation fallen, shredded or torn?			
Or is the fiberglass covered with plastic or Tyvek?			
If YES, are there visible stains on the Tyvek or underside of the plastic, facing the insulation?			
Can you see any animal droppings?			
Are there crawl space vents?			
Is the crawl space open to the basement?			
Are there any pipes present?			
Do any appear to be leaking?			
Is there condensation on the walls or pipes?			
Are there any possessions stored in the space?			
Does the crawl space smell musty?			
Is there visible mold? (Check where visible.)			
If YES, where? On the joists? On the subflooring at the ceiling? On the foundation walls? On stored goods if present? Other _____			
What is the relative humidity? _____			
What is the temperature? _____			

IF THERE IS AN **UNFINISHED BASEMENT**, COMPLETE THIS SECTION:

QUESTION	YES	NO	COMMENTS
Is there a bulkhead?			
Is there an interior door?			
Is there any exposed dirt in the basement or bulkhead?			
Is there a walk-out door to the exterior?			
Are there personal possessions in the basement?			
Are they resting on the concrete floor?			
Are they leaning up against the foundation walls?			
Are there cardboard boxes on the floor or up against the walls?			
Are any possessions sitting on a dirt floor?			
Are there couches or upholstered furniture present?			
Is there mold growth on the bottoms or backs of wood furniture?			
Are there shelves, a workbench, or other built-ins present?			
Is there mold growth on surfaces of wood built-ins?			
Is there a storage area with a door?			
If YES, is there mold on the door or on shelves and surfaces within?			
Is there a laundry area in the basement?			
Are there carpets or rugs on the concrete floor?			
Are there mouse urine (red stains) or mouse droppings?			
(Check where visible.) On top of the foundation wall In the corners, on floor joists Other			
Is there exposed fiberglass ceiling insulation?			
If YES, is any of the insulation ripped, shredded or torn?			
Or is the insulation covered with plastic or Tyvek?			
If YES, are there visible stains on the underside of the plastic or Tyvek, facing the insulation?			
Do you see any evidence of other pest infestations?			
If YES, what and where?			
Do any of the pipes appear to be leaking?			
If YES, which pipes?			
Is there visible condensation?			
On the lower few feet of the foundation walls?			
On cold-water pipes?			

QUESTION	YES	NO	COMMENTS
Is a musty smell present?			
Is there visible mold?			
(If yes, check where visible.) On the joists On the subfloor On the foundation walls On shelves On stored goods Other _____			
Is there a portable dehumidifier present?			
If yes, how many and where located?			
Is each dehumidifier running? If NO, how many are running?			
Does the dehumidifier have a bucket that must be emptied?			
If YES, is the bucket full?			
Does the dehumidifier drain into a sink, sump or to the exterior?			
What is the relative humidity? _____			
What is the temperature? _____			

IF THERE IS A **FINISHED BASEMENT**, COMPLETE THIS SECTION:

QUESTION	YES	NO	COMMENTS
Do people sleep there?			
Are there CO detectors present near each bedroom?			
Is there wall-to-wall carpeting present?			
Is a musty smell present?			
Is there visible mold?			
(If YES, check where visible.) On exterior walls On the backs and bottoms of furniture In closets On baseboard convectors Other _____			
Are there rust stains on any baseboard convectors?			
Are the heating units dirty or dusty?			
Do all rooms have heat supplies?			
Is there a dehumidifier present?			
How many and where located? On baseboards _____			
Is each dehumidifier running? _____ If not, how many are running? _____ Does each dehumidifier have a bucket that has to be emptied? Is the bucket full? Or does each dehumidifier drain into a sink, sump or to the exterior?			
What is the relative humidity in the hallway? _____			
What is the temperature in the hallway? _____			
Is there a bathroom present?			
(If YES, fill out section below. If NO, skip to next section)			
Any stains under the sink?			
Any leaking pipes?			
Any visible mildew? (If yes, check below.) Walls Ceiling Vanity, inside or out Kick space under vanity Tile Door			
Is there a bathroom exhaust fan present?			
Does it have good draw?			
Does it exhaust to the exterior?			
Is there a shower or tub?			
Check all visible conditions: Shower curtain Shower splash guards Shower door Loose tiles Window in shower enclosure Other , Explain _____			

MECHANICAL SYSTEMS

QUESTION	YES	NO	COMMENTS
Fuel or energy source Oil Gas or Propane Electricity Wood			
Heat Delivery: Forced hot air			
If hot air heat: Is a return duct dusty or dirty? (Remove grille and look inside.)			
Are heat supplies dusty or dirty? (Remove two grilles and look inside.)			
Is there a filter in the furnace?			
If yes, check type Fiberglass Pleated media filter Washable Electronic			
Is the filter dirty?			
Is the blower cabinet dusty?			
Is there fibrous lining material on the access panel or in the blower cabinet?			
Does liner have water/moisture stains?			
Heat Delivery: Steam			
Radiators Are they dusty?			
Heat Delivery: Hot water			
If hot water, which type of system? Radiators Are they dusty? Baseboards Are the bottoms of the fins dusty?			
Heat Delivery: Wood stove			
Do they clean the chimney pipe annually?			
Is the wood stored inside the house?			

AIR CONDITIONING

QUESTION	YES	NO	COMMENTS
Is there central air conditioning?		Skip to next section	
Is there dust or debris on the 'return side' of the cooling coil?			
Are there black spots on the dust or coil?			
Is there fibrous lining material in the blower cabinet or on the cabinet access panel?			
Does the liner have water/moisture stains?			
Are there floor-water stains under the air-handling unit?			
Is there a filter present?			
<p style="text-align: right;">If YES, what type?</p> <p style="text-align: center;">Fiberglass Pleated media filter Washable Electronic</p>			
Is the filter dirty?			
<p>Which kind of duct is present?</p> <p style="text-align: center;">Panned return bays Metal Flexible Other _____</p>			
<p>Duct insulation</p> <p style="text-align: center;">None Interior Exterior</p>			

PORTABLE AIR CONDITIONERS

QUESTION	YES	NO	COMMENTS
Are there window or wall air conditioners present?		Skip to next section	
Where is/are the unit or units?			

Fill out the information below for each Air Conditioning (A/C) unit.

QUESTION	A/C Unit 1 N/A	A/C Unit 2 N/A	A/C Unit 3 N/A
Does A/C Unit have a filter?			
Is the filter dirty?			
Is there dust on the coil?			
Are there any dark gray or black spots?			
On the blower			
On the walls of the supply side			
On the grille			
Is the unit ever removed?			
If yes, where is it stored?			

ABOVE-GRADE LIVING SPACES

ROOMS WITHOUT WATER

(Fill out chart below - BR is bedroom, LR is living room, DR is dining room or area)

QUESTION	BR1	BR2 N/A	BR3 N/A	LR N/A	DR N/A	Other _____
Visible mold						
Exterior-facing Closets						
Furniture						
Musty smell						
Exterior-facing Closets						
Furniture						
Feather-filled furniture or bedding						
Dust-mite covers?	Y N If YES...					
Mattresses						
Pillows						
Box Springs						
Water stains on walls						
Water stains on ceilings						
Wall-to-wall carpets						
CO detectors						

ROOMS WITH WATER

LAUNDRY AREA

QUESTION	YES	NO	COMMENTS
Is there visible lint behind the dryer?			
Is the dryer exhaust hose intact?			
Does the dryer vent to the exterior?			
Any water stains near the washing machine?			

BATHROOMS (fill out for each bathroom).

QUESTION	BATHROOM 1	BATHROOM 2 N/A	BATHROOM 3 N/A
Any stains under the sink?	Y N	Y N	Y N
Any leaking pipes?	Y N	Y N	Y N
Any visible mildew?	Y N IF YES, WHERE?	Y N IF YES, WHERE?	Y N IF YES, WHERE?
Walls			
Ceiling			
Vanity, inside or out			
Kick space under vanity			
Tile			
Door			
Window Frame			
Other (Explain)			
Is there a bathroom exhaust fan present?	Y N IF YES ...	Y N IF YES ...	Y N IF YES ...
Does it have good draw?	Y N	Y N	Y N
Does it exhaust to the exterior?	Y N	Y N	Y N
Is there a shower or tub?	Y N IF YES ...	Y N IF YES ...	Y N IF YES ...
Shower curtain	Y N	Y N	Y N
Shower guards	Y N	Y N	Y N
Shower door	Y N	Y N	Y N
Loose tiles	Y N	Y N	Y N
Window in shower enclosure	Y N	Y N	Y N

KITCHEN

QUESTION	YES	NO	COMMENTS`
Gas stove?			
Is there a kitchen exhaust fan over the stove?			
If YES, Does it vent to the exterior?			
Are there mouse droppings in or on top of the cabinets?			
Are there leak stains under the kitchen sink?			
Any visible pipe leaks? Sub-zero refrigerator?			
Are the refrigerator coils dirty?			
Does the refrigerator have a drip tray?			
If YES, Is the drip tray dirty?			

ATTIC

QUESTION	YES	NO	COMMENTS`
Is there an attic?			
If YES, is there attic access?			If NO, skip to final SECTION
If YES, access type:			
Pull-down stairs: Is the panel warped?			
Door: Does the door close tightly?			
Hatch: Tight Fitting?			
Do the kitchen and/or bathroom fans vent to the attic?			
Do the kitchen and/or bathroom fans vent into the soffit?			
Does there appear to be mold growth on the sheathing?			
Is there exposed fiberglass insulation present?			
If YES, Does the insulation appear to be dirty? Does the insulation contain rodent droppings?			
Can you see any bat guano at vents			
Can you see any other signs of animal infestation in the attic?			
If yes, describe: _____			

Date and time site inspection started: _____

Date and time site inspection ended: _____

Total time spent inspecting the site: _____

4. Educational Guide for Residents and Professional Staff

A. General education on mold and moisture:

Mold can grow within 24 to 48 hours wherever moisture (from leaks, spills, high relative humidity, and/or condensation) and food sources (skin scales and insect body parts in dust, and cellulose in drywall, cardboard, and paper, for example) are present. Paint can peel or mold growth or odors develop from a single moisture event. Indoor mold growth is a potential health hazard.

For home occupants

- Relationship between relative humidity and mold growth.
- Steps that can minimize moisture (both from the exterior and interior) and mold growth.
- Maintenance of mechanical systems.
- Each home occupant can be instructed on **five rules** (among many) to follow in battling indoor mold:
 - Control relative humidity below-grade.
 - Avoid condensation.
 - Keep the mechanical systems clean.
 - Reduce clutter.
 - Don't put carpet or cardboard boxes on concrete.

For health officer - all the above plus

- Basic components of a house, including heating, ventilation and A/C (air conditioning) systems.
- Home maintenance, both interior and exterior, that can control relative humidity and minimize mold growth.
- Mold growth: what is and isn't mold, and how to spot mold with the help of a mirror and flashlight.

B. Some simple steps home occupants can take to battle mold and control moisture and some allergy triggers (refer to Section I of assessment tool).

"The Mold Survival Guide: For Your Home and for Your Health" and "Jeff's May's Healthy Home Tips" (author Jeffrey C. May, The Johns Hopkins University Press) offer more guidance.

Air conditioning equipment.

- In the winter, close supplies and cover returns that are part of a distribution system used only for cooling (are not part of a heating system).
- Clean portable air conditioners before the start of every cooling season. Take each unit outside, remove the cover, protect the blower motor and electrical compartment by

covering them with aluminum foil, and lightly spray the interior with a dilute bleach/water solution (one part bleach to ten parts water). Do not wet electrical components other than wires. Rinse with a light flow from a hose.

- Allow to drip dry before reassembling and installing in place. Add supplementary filtration material (MERV 7 to 8) at the air intake side (www.webproducts.com); cut filter to size and replace annually.

Appliances.

- The dryer hose should be metal, not crushed, and should have no holes or gaps. The dryer should vent to the exterior.
- Annually vacuum under and around the refrigerator. Use a 36-inch vacuum crevice tool to get to hard-to-reach spaces and between the coils (google "36-inch crevice tool" AND "vacuum").
- If your refrigerator has a drip tray, clean the tray twice a year. If the tray is plastic,
- put 2 tablespoons of salt in the tray to help minimize the growth of bacteria, yeast and mold.

The Basement.

- Store possessions on plastic or metal shelves, up off the floor and away from the foundation walls.
- Don't put carpeting, rugs or cardboard boxes on a concrete floor.
- A finished as well as unfinished basement should be dehumidified in the humid season - generally mid-April to mid-October. Measure the relative humidity (RH) with a hygrometer, available in many hardware and building supply stores; or use an RH Humidity Alert, available through Therma-Stor (www.therma-stor.com). If the RH rises above 50%, improve dehumidification. Keep doors open; don't isolate any space (like a closet) from the dehumidification.
- Heat finished basement spaces in the winter, with the thermostat set at no lower than 60°F - whether the space is being used or not.

Bedrooms.

- If anyone in the house is allergic to dust mites, put polyurethane-backed dust-mite covers on all mattresses, pillows and box springs -not just those of the allergy sufferer(s).
- If anyone in the house has allergies or asthma, don't let pets into bedrooms.

Cleaning and laundry.

- Use a HEPA vacuum (a vacuum with a high efficiency particulate arrestance filter).
- HEPA vacuum baseboard convectors and/or radiators before the heating season every year. Use a 36-inch vacuum crevice tool to get to hard-to-reach spaces (google "36-inch crevice tool" AND "vacuum").
- Don't use clothing detergents that contain enzymes.

Cleaning up mold.

Containment: Home occupants or maintenance personnel can tackle cleaning an area less than 10 square feet in size with surface mold growth not caused by leaks. Professional remediators should clean surfaces that have mold growth caused by leaks, or that are greater than 10 square feet in size, or that experienced major flooding, or flooding from category 2 water (water from a washing machine, overflowing toilet with urine but no feces, or when water has flowed over a very dirty carpet) or category 3 water (from sewer backup, overflowing toilet that contained feces, or a river that contains silt, organic debris or dangerous chemicals). If the moldy surface is inside and cannot be removed from the house for cleaning, isolate the space by keeping doors closed to other spaces or by setting up a "wall" with Zipwalls (available in building supply stores; www.zipwalls.com - 800-718-2255). Remove non-moldy items from the containment area, or, if non-moldy items are not removable, seal them with sheet plastic to protect them from moldy dust. Operate a fan or HEPA-filtered exhaust to set up negative pressure. Wear protective clothing, including gloves and a two-strap NIOSH N95 mask or a P-100 half-face respirator.

- Learn to look for mold growth using a flashlight and mirror.
- Clean moldy, finished wood furniture surfaces with a suitable household product.
- Whenever possible, do this work outside.
- Wipe moldy unfinished wooden surfaces with denatured alcohol and then paint with clear shellac. Whenever possible, do this work outside.
- Grout that contains mold growth can be scrubbed with an old toothbrush and a solution of water and a suitable household cleaning product, or a mild bleach/water solution (one part bleach to ten parts water).
- Solid, non-porous surfaces (other than furniture) can be washed with a solution of an appropriate household cleaner and water, or with a mild bleach/water solution (one part bleach to ten parts water). If using a bleach solution, test a small spot first to be sure the bleach won't damage the surface.
- Dry-clean or wash musty-smelling clothing or bedding.
- Discard moldy or musty-smelling mattresses and pillows.
- Stuffed, cushioned furniture that contains visible mold or that smells musty should be discarded or reupholstered, and solid surfaces cleaned as directed above.

A crawl space enclosed by walls and located under an interior room or rooms.

- Dehumidify during the humid season (generally from mid-April to mid-October).
- Measure the relative humidity (RH) with a hygrometer, available in many building supply and hardware stores (or get a Humidity Alert through Therma-Stor - www.therma-stor.com - which records the RH and sounds an alarm when it exceeds the set point). Keep the relative humidity at or below 50%.

Mechanical Systems

- If you have an exhaust-only ventilation system, operate the system during the winter, but only if the system is clean and mold-free (see "C" section below).

Moisture control.

- Dehumidify the basement - whether finished or unfinished - during the humid season. Measure the relative humidity (RH) with a hygrometer, available in many building supply and hardware stores (or get a Humidity Alert through Therma-Stor - www.therma-stor.com - which records the RH and sounds an alarm when it exceeds the set point). Keep the relative humidity at or below 50%.
- Keep finished, partially below or below-grade rooms consistently warm in winter, with thermostat set to a minimum of 60°F - whether the space is being used or not.
- Operate the ceiling exhaust fan as well as a table or tower oscillating fan (plugged into GFI outlet) in a bathroom for an hour after showering. Leave the bathroom door as well as the shower door or curtain open.
- Operate the stove-exhaust fan when cooking. Optimally, the fan should exhaust to the exterior.

Other.

- Cover a carpet that contains visible mold or smells musty with the adhesive-backed plastic Pro-tect (available in many hardware and building supply stores; www.pro-tect.com) until the carpet can be removed under containment and discarded (but do not cover a damp carpet).
- If you use a humidifier, only use the warm-mist type.
- Keep a log of symptoms: where suffered, when, and under what conditions, to help you identify possible triggers for the symptoms.

C. Steps the Tribe could take to help home occupants battle mold and moisture problems (Section II of the assessment tool).

If some of these steps are the home occupants' responsibility, move the items as appropriate. Containment should be set up as necessary.

1. General.

- Supply dumpsters to help residents reduce clutter.
- Provide dehumidifiers and hygrometers.
- Provide education about relationship between relative humidity and mold growth.
- Provide residents with two-strap NIOSH N95 masks and/or P-100 or N95 half-face respirators.
- Provide residents with HEPA vacuums, as well as polyurethane-backed dust-mite covers for pillows, mattresses and box springs - especially if anyone in the family has allergies and/or asthma.

- Provide residents with a roll of the adhesive-backed plastic Pro-tect (available in many hardware and building supply stores; www.pro-TECT.com).
- Purchase one or two steam-vapor machines for the community's use. See Resource List.
- Promptly repair plumbing leaks.

2. Listed in order of Section II of Assessment Tool.

The exterior

- Clean gutters and downspouts twice a year.
- Extend downspouts away from the foundation walls.
- Correct grading so ground slopes away from the foundation walls.
- Seal up any openings or gaps that could allow pest entry. Don't forget openings between a garage and the house.
- Repair/replace decayed wood. Be sure end-grain is sealed on any replaced trim.

A crawl space enclosed by walls and located under an interior room or rooms.

- Cover a dirt floor with mesh-reinforced plastic, secured to foundation walls. If access is needed, lay down pressure-treated wood for pathways. If the ground is uneven, use flexible rubber mats that are made for the purpose.
- Under containment, remove any ripped or torn exposed fiberglass insulation. Then HEPA vacuum and then lightly spray-paint the wood to adhere residual dust.
- If building codes allow, insulate the crawl space with solid sheet-foam insulation on the foundation walls rather than install fiberglass insulation between the joists.
- If building codes require fiberglass insulation, cover the insulation with Tyvek, stapled to the joists.

An unfinished basement

- Cover a dirt floor in a basement or the bulkhead with mesh-reinforced plastic, secured to the foundation walls. If access is needed, lay down pressure-treated wood for pathways. If the ground is uneven, use flexible rubber mats that are made for the purpose.
- Install an interior door at the bulkhead.
- Under containment, remove any ripped, shredded, exposed fiberglass insulation and then HEPA vacuum and then lightly spray-paint the joists and sub-floor to adhere residual dust.
- HEPA vacuum other surfaces, including the tops of foundation walls.
- If building codes allow, insulate the foundation walls with two-inch solid sheet-foam insulation, rather than install fiberglass insulation at the basement ceiling.
- There should not be any exposed fiberglass insulation in a basement.

A finished basement

- Remove carpeting and install vinyl or ceramic tile flooring.
- Replace solid closet doors with louvered doors.

Mechanical equipment

- Clean hot-air heat and central air conditioning systems, including blower cabinets and AC coils, and provide upgraded filtration (a minimum of MERV 8). Filters should be changed according to the manufacturer's recommendations, but at least once a year.
- Where feasible, replace fibrous lining material in furnace or air-conditioning blower cabinet and on access panel with foil-covered lining material.
- Clean air-to-air heat exchangers according to manufacturer's schedule and provide supplemental, in-line filtration (minimum MERV 8 with static pressure max of .1 inches) at both the fresh air intake and the house air intake sides. Filters should be changed twice a year.
- Look for mold in exhaust-only ventilation systems (including trickle vents) annually and clean as needed.

Rooms with water

- Install cooking exhaust fans in kitchens. The fans should exhaust to the exterior.
- Bathrooms should have quiet exhaust fans that work and that exhaust to the exterior.

Attic:

- Install an attic "tent" over pull-down stairs or an insulated access-hatch cover.

Battling moisture and mold is a process. Sometimes taking simple steps can lead to enormous improvement. At other times, however, many steps have to be taken before improvement is noticeable.

5. General Guidelines for Professional Remediation

NOTE

Professional remediators should tackle areas that have mold due to leaks, as well as areas greater than 10 square feet, and spaces that experienced major flooding, leakage or flooding with category 2 water (from washing machine, overflowing toilet with urine but no feces, or when water has flowed over a very dirty carpet), or leakage with category 3 water (from sewer backup, overflowing toilet that contained feces, or a river that contains silt, organic debris or dangerous chemicals). All remediation, other than incidental cleaning, must be done under containment. Workers should use The New York City Department of Health and Mental Hygiene's "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" (<http://home2nyc/html/doh/html/home/home.shtml>) as well as the Institute of Inspection, Cleaning and Restoration (IICRC)'s S520 Mold Remediation Standard (www.iicrc.org/s520info.shtml), for procedures and protocols.

Remediation

A crawl space enclosed by walls and located under an interior room or rooms

The crawl space must be emptied out. Anything the home occupant wishes to keep that has solid surfaces only should be placed in some kind of outside storage unit until the object or objects can be properly cleaned. Any cushioned materials, including mattresses and pillows, as well as upholstered furniture, that were in the crawl space should be discarded (furniture can also be reupholstered). All exposed fiberglass insulation should be removed and all surfaces HEPA vacuumed. If there is no visible mold, wood surfaces (such as joists and the sub-floor) should then be lightly spray-painted to seal. If there is visible mold, the colonies should be eliminated by standard methods first before the surfaces are HEPA vacuumed and lightly spray-painted. Foundation walls should be washed with a suitable detergent solution and then when dry, paint-sealed with an appropriate product. Dehumidify (or ventilate, if appropriate) the area to hasten drying. Monitor the relative humidity (RH) with a hygrometer or with Therma-Stor's Humidity Alert (www.therma-stor.com). Do not allow the RH to remain over 70% for more than 24 hours. Any exposed soil should be covered with a vapor barrier (mesh-reinforced plastic and not just 6 mil poly), fastened to walls and beam supports. Put pressure-treated wood on top for access paths. If the ground is uneven, use rubber mats made for the purpose. If possible, a better alternative would be to remove some of the soil, put down crushed stone and a vapor barrier, and then concrete. There should be no exposed fiberglass insulation in a crawl space. If re-insulating, put solid-sheet foam insulation up against the foundation walls if building codes permit this practice. Refer to www.crawlspaces.org for further information.

An unfinished basement

Anything the home occupant wishes to keep that has solid surfaces only should be placed in some kind of outside storage unit until the object or objects can be properly cleaned. Any

cushioned materials, including mattresses and pillows, as well as upholstered furniture, that were in the crawl space should be discarded (furniture can also be reupholstered). All exposed fiberglass insulation should be removed and all surfaces HEPA vacuumed. If there is no visible mold, wood surfaces should then be lightly spray-painted to seal. If there is visible mold, the colonies should be eliminated by standard methods first before the surfaces are HEPA vacuumed and lightly spray-painted. Dehumidify (or ventilate, if appropriate) the area to hasten drying. Monitor the relative humidity with a hygrometer. Do not allow the RH to remain over 70% for more than 24 hours. Any dirt floor, whether in the bulkhead area or basement, must be covered with a vapor barrier attached to walls (mesh-reinforced plastic and not just 6 mil poly). If the ground is uneven, use rubber mats made for the purpose. If future access into the basement is needed, place pressure-treated planks on top of the barrier. It is preferable, however, to remove some soil and install crushed stone and a vapor barrier and then concrete. The bulkhead must have an interior door. Seal any openings or gaps at the exterior, including around the interior door that could be rodent pathways into the basement. If re-insulating, put solid-sheet foam insulation up against the foundation walls if building codes permit this practice.

Finished below-grade or partially below-grade spaces

Empty all spaces. Anything the home occupant wishes to keep that has solid surfaces only should be placed in some kind of outside storage unit until the object or objects can be properly cleaned. Any cushioned materials, including mattresses and pillows, as well as upholstered furniture, should be discarded (furniture can also be reupholstered). Moldy carpets and pads should be removed under containment and then discarded. HEPA vacuum baseboard convectors or radiators, and if needed, treat them with steam vapor to eliminate all dust between the fins. HEPA vacuum all surfaces. Walls and ceilings that contain surface dust should be washed with a solution of water and an appropriate household cleaner. For walls and ceilings that have been wet from foundation or pipe leaks, wall and ceiling materials, as well as insulation, may have to be removed and the surfaces beneath treated as appropriate. Monitor the relative humidity (RH) with a hygrometer or with Therma-Stor's Humidity Alert (www.therma-stor.com). Do not allow the RH to remain over 70% for more than 24 hours.

After Remediation

A crawl space enclosed by walls and located under an interior room or rooms

Personal goods should not be stored in a crawl space, which should be isolated from the exterior and dehumidified in the humid season (generally from mid-April to mid-October), either with its own dehumidifier (see Santa Fe Compact, www.therma-stor.com) or by being open to a dehumidified basement. Monitor the relative humidity (RH) with a hygrometer or with Therma-Stor's Humidity Alert (www.therma-stor.com). Increase dehumidification if the RH exceeds 50%. Any openings potentially allowing pest entry into the crawl space should be sealed.

An unfinished basement

Cleaned possessions can be reintroduced into the space. Nothing biodegradable should sit directly on the concrete floor or lean up against the foundation walls, unless solid-sheet foam insulation is on the floor and/or up against the walls. Alternatively, goods can be placed on plastic or metal shelves, up off the floor and at least 18 inches away from the foundation walls. Keep goods made of paper or cloth in plastic bags or in plastic boxes with lids. No rugs should be placed on the concrete floor. If you have a laundry area in the basement and want more comfort under foot, lay rubber mats down.

The basement must then be dehumidified in the humid season (mid-April to mid-October). Attach the dehumidifier to a condensate pump that discharges into a sink, sump, or to the exterior. Monitor the relative humidity (RH) with a hygrometer or with Therma-stor's Humidity Alert (www.therma-stor.com). Increase dehumidification if the RH exceeds 50%.

Finished, below-grade or partially below-grade space

Consider installing hard flooring rather than carpeting. If wall-to-wall carpeting is to be reinstalled and there is adequate clearance, put solid sheet-foam insulation on the concrete floor, then plywood, and then the carpet. Dehumidify all below-grade or partially below-grade spaces in the humid season (from mid-April to mid-October). Attach the dehumidifier to a condensate pump that discharges into a sink, a sump or to the exterior. If necessary, use a larger capacity machine such as a Santa Fe or the Santa Fe Compact (www.therma-stor.com), both of which can be attached to a duct system. Do not allow any spaces (closets, rooms) to remain isolated from the dehumidification, so keep doors open. Monitor the relative humidity (RH) with a hygrometer or with Therma-Stor's Humidity Alert (www.therma-stor.com). Increase dehumidification if the RH exceeds 50%. Keep such spaces consistently warm in winter, whether in use or not, with the thermostat set at a minimum of 60°F.

Appendices

Appendix A: Additional Resources

(refer to Jeffrey C. May's "The Mold Survival Guide: For Your Home and for Your Health" for a longer resource list.)

Organizations

American Public Health Association, Washington, DC (202-777-APHA; www.apha.org)

Asthma and Allergy Foundation of America, Washington, DC (800-727-8462; www.aafa.org)

Centers for Disease Control and Prevention, Atlanta, GA (800-232-4636; www.cdc.gov)

Children's Environmental Health Network, Washington, DC (202-543-4033; www.cehn.org)

Environmental Protection Agency (EPA), Washington, DC (202-272-0167; www.epa.gov)

Indoor Air Quality Association, Rockville, MD (301-231-8388; www.iaqa.org)

National Center for Healthy Housing, Columbia, MD (410-992-0712; www.nchh.org)

Publications

"Brief Guide to Mold, Moisture and Your Home," EPA 402-K-02-003, summer 2002 (800-438- 4318).

"Cleaning Up Your House after a Flood," Canadian Mortgage and Housing Corporation (613- 748-2367).

"Damp Indoor Spaces and Health," Committee on Damp Indoor Spaces and Health, Institute of Medicine, National Academy of Sciences, 2004 (www.iom.edu/CMS/3793/4703/20223.aspx).

"Flood Cleanup: Avoiding Indoor Air Quality Problems," EPA 402-F-93-005, August 1993 (800-438-4318).

Fungal Contamination: A Manual for Investigation, Remediation and Control, Hollace S. Bailey, Florida: BECi, 2005 (www.becifl.com).

My House is Killing Me! The Home Guide for Families with Allergies and Asthma, Jeffrey C. May, Baltimore, MD: Johns Hopkins University Press, 2001.

How to Operate Your Home, Tom Feiza, "Mr. Fix-It," Inc., New Berlin, WI: Mr. Fix-It Press, 2006 (262-786-7878).

The Mold Survival Guide: For Your Home and for Your Health, Jeffrey C. May and Connie L. May, Baltimore, MD: Johns Hopkins University Press, 2004.

Websites

The CDC's "Environmental Hazards and Health Effects - Mold" Website. www.cdc.gov/mold/:

EPA's "Mold Resources" www.epa.gov/mold/moldresources.html:

The Money Pit's Home Improvement Radio Show's "Mold Resource Guide."
<http://www.moneypit.com/ideas-tips/mold-resource-guide.html>:

Appendix B: Photo Library



0201 Mold on portable AC



4381 dust on frig coils



5510 mold inside cabinet door



5512 probable mold at bsrd convector



5513 probable moldy dust



5520 mold inside trickle-vent pipe



5531 mold in bsmnt window



5537 mildew under table



5553 mold on stored box



5557 dirty HRV indoor air filter



5564 short gutter causing rot



5614 soiled refrig drip tray



5625 mold on stored furniture



5653 soot spillage at boiler



6008 mouse-urine trail at main beam

Appendix C: Equipment Resources

Dehumidifier: Therma-Stor in Madison, WI (800-533-7533; www.therma-stor.com).

Floor water alarm: available in many hardware and building supply stores. See www.gizmode.com

HEPA vacuums: www.allergybuyersclub.com, www.miele.com.

Hygrometer: available online and in many hardware and building supply stores. Therma-Stor sells the "Humidity Alert," a recording thermo-hygrometer.

Mask: A two-strap, NIOSH N95 mask is available in many hardware and building supply stores. Look for 3M #8210 or Gerson #1710.

Media filters: Available in some building supply and hardware stores. Also see www.aprilaire.com, www.filterusa.com, www.yourhome.honeywell.com.

Steam vapor machine: see www.allergybuyersclub.com. Consider a Focaggi or LadyBug machine. Lower price options include White Wing, Stemax and Reliable.

Smoke pencil: Zero Toys, Concord, MA. (www.zerotoys.com). 36-inch vacuum crevice tool: Google for "crevice tool" and "vacuum." Good for reaching under and behind refrigerators and for cleaning radiators.